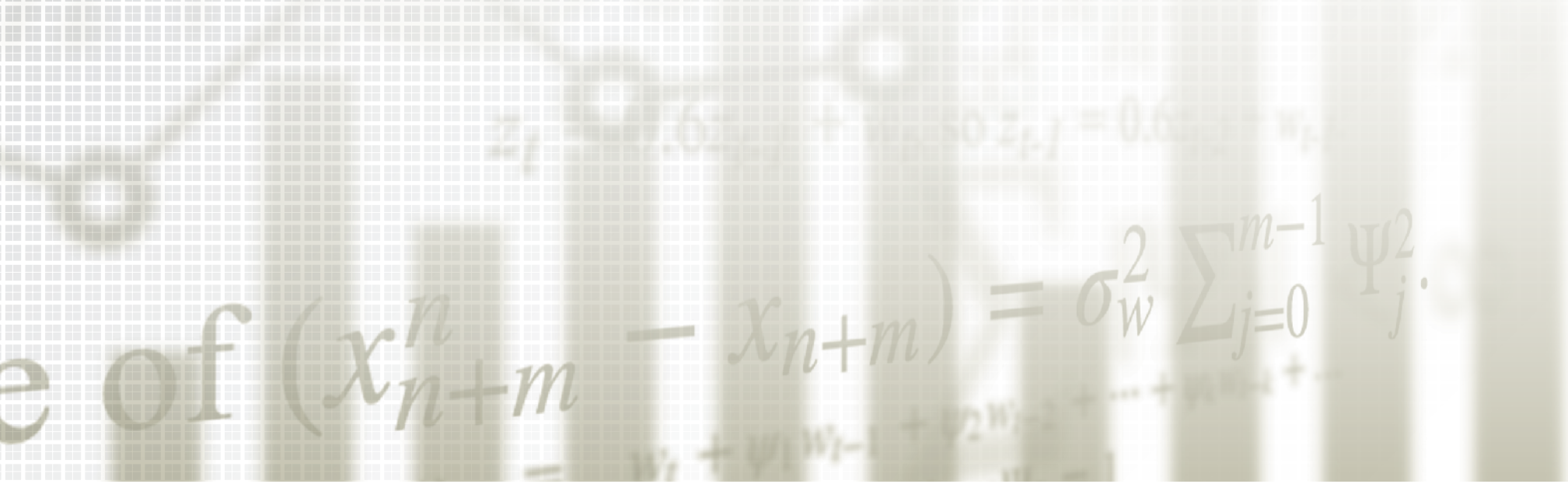
NOVA | Northern Virginia Community College

Scientific Literacy
Core Competency Assessment Report: 2019-2020



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Office of Institutional Effectiveness and Student Success

The purpose of the Office of Institutional Effectiveness and Student Success is to conduct analytical studies and provide information in support of institutional planning, policy formulation, and decision making. In addition, the office provides leadership and support in research-related activities to members of the NOVA community engaged in planning and evaluating the institution's success in accomplishing its mission.

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Scientific Literacy
CORE COMPETENCY ASSESSMENT REPORT: 2019-2020

Introduction

In 2017-2018, Northern Virginia Community College (NOVA) began implementing course embedded assessment of General Education Core Competencies, which NOVA calls "Core Learning Outcomes." Prior to 2017-2018, Virginia Community College System (VCCS) required NOVA to assess General Education Core Competencies using standardized assessments chosen by the VCCS. The State Council of Higher Education for Virginia (SCHEV) adopted the *Policy on Student Learning Assessment and Quality in Undergraduate Education in July 2017.*[1] It mandates every Virginia public institution of higher education assess six general education competencies at least twice in a six-year period. Four core competencies are mandated by SCHEV to be assessed by all institutions: Critical Thinking, Written Communication, Quantitative Literacy, and Civic Engagement. Two additional educational competencies, based upon SCHEV's guidelines, were to be selected by the institutions themselves. The VCCS selected Professional Readiness and Scientific Literacy as their two additional core competencies. This document contains Scientific Literacy assessment reports contributed by programs and disciplines for NOVA.

VCCS Policy: General Education (5.0.2) defines Scientific Literacy as "*the ability to apply the scientific method and related concepts and principles to make informed decisions and engage with issues related to the natural, physical, and social world. Degree graduates will recognize and know how to us the scientific method, and to evaluate empirical information*."[2]

Based on Northern Virginia Community College's Ad Hoc Committee on General Education Assessment (Spring 2016) and recommendations from SCHEV (July 2017), NOVA employs embedded course assessment, which is a direct measure using students' actual work or student performance. In 2019-2020, NOVA assessed Professional Readiness and Scientific Literacy. Rather than select just one or two courses to assess, NOVA chose to examine the core competencies across the curriculum based on best practice.[3]

The assessment process at NOVA is faculty-driven. As Tables One and Two make clear, the assessment process engages a significant number of teaching faculty, academic deans, and provosts. Table One details the Pathway Provosts and Deans and Program Lead Faculty for 2019-2020 when the assessments were conducted. Table Two lists Pathway Provosts and Deans and Discipline Chairs/CLO Contacts for 2019-2020. Such widespread faculty participation is not only in compliance with *SACSCOC Principles of Accreditation*, but is also integral to maintaining a culture of assessment and promoting data-driven decision-making.[4]

At the beginning of the 2019-2020 planning and evaluation cycle, each instructional program, select certificate, and discipline without a degree determined which Core Learning Outcome (CLO) would be assessed for 2019-2020, Professional Readiness or Scientific Literacy. They also

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[1] State Council of Higher Education for Virginia. *Policy on Learning Assessment and Quality in Undergraduate Education.* Richmond: SCHEV, 2017. Digital.
[2] Virginia Community College System. "General Education, Section 5.0.2." *Policy Manual,* 2019. Digital.
[3] Eggen, Theo and Bernard Veldkamp. "A General Framework for the Validation of Embedded Formative Assessment." *Journal of Educational Measurement* (2019): 1-18. Digital. Gerretson, Helen and Emily Golson. "Introducing and Evaluating Course-Embedded Assessment in General Education." *Assessment Update* 16.6 (2004): 4-6. Digital. Garfolo, Blaine, et al. "The Use of Course Embedded Signature Assignments and Rubrics in Programmatic Assessment." *Academy of Business Journal* 1.1 (2016): 8-20. Digital. Kumar, Rita, et al. "Purposeful Assessment Design: Aligning Course-Embedded Assessment with Program-Level Learning Goals." *Business Education Innovation Journal* 10.1 (2018). Digital.
[4] Carpenter, Rowanna and Celine Fitzmaurice. "Assessment and Faculty Support: Fostering Collegial Community to Strengthen Professional Practice." *Journal of General Education.* 67.1-2 (2018): 90-108. Digital. Elliott, Robert and Diane Oliver. "Linking Faculty Development to Community College Student Achievement: A Mixed Methods Approach." *Community College Journal of Research and Practice.* 40.2 (2016). Digital. National Institute for Learning Outcomes Assessment. "What Faculty Unions Say About Student Learning Outcomes Assessment." 2011.

determined how they would operationalize the CLO and create a common assessment method. At the end of the planning and evaluation cycle, each instructional program, select certificate, and discipline analyzed and documented the results of their assessment activities. Based on their results, programs, select certificates, and disciplines determined actions to seek improvements to assessment and student learning, addressing Section 8.2.b (Student Achievement) of the *SACSCOC Principles of Accreditation*.[5]

This report documents the assessment of Scientific Literacy by degree-granting programs, select certificates, and disciplines without degrees. It reports on the varied assessment methods and targets, the assessment results and analysis, and the ways in which the results will be used to seek improvement as reported in either the *Annual Planning and Evaluation Report* (APER) used by Instructional Programs/ select certificates, or the *Core Learning Outcome Report* (CLO Report), used by disciplines without degrees. This report is one of two General Education/ Core Competency Assessment Reports completed for the 2019-2020 cycle. The second *Core Learning Competency Assessment Report for 2019-2020* is a compilation of the Professional Readiness assessments. Each of these documents provides the CLO assessment reports for degree programs and standalone certificates first, followed by disciplines without degrees, and each section is presented alphabetically by program/discipline name.

[5] SACSCOC. "Section Eight: Student Achievement." *The Principles of Accreditation: Foundations for Quality Enhancement.* 6th. Decatur, GA: Southern Association of Colleges and Schools Commission on Colleges, 2017. Paper.

CORE COMPETENCY ASSESSMENT REPORT: 2019-2020

Submitted by Instructional Programs/ Select Certificates: 2019-2020

Table 1. Program/Certificate Pathway Provost, Deans, and SLO Lead Faculty: 2019-2020 Core Competency Assessed

Pathway Provost & Dean	Program/Certificate	Faculty Chair/ Assessment Lead	Core Competency	
			PR	SL
Business and Hospitality Management Annette Haggray, AL Ivy Beringer, AL	Accounting, A.A.S.*	Steven Fritsche, MA	-	-
	Business Administration, A.S.	Kabir Jamal, AL	X	
	Business Management, A.A.S.	Kabir Jamal, AL		X
	Contract Management, A.A.S.*	Aldous McCrory, MA	-	-
	Hospitality Management, A.A.S.	Ben Wang, AN	X	
	Marketing, A.A.S.	Judy McNamee, AN	X	
Education and Public Service, Molly Lynch, MA, Evette Hyder-Davis, MA	Administration of Justice, A.A.S.	Timothy Dickinson, AL	X	
	Drivers Education Career Studies Certificate	Nicole Mancini, MA	X	
	Early Childhood Development, A.A.S.	Susan Johnson, LO	X	
	Paralegal Studies, A.A.S.	Joyce McMillan, AL	X	
	Social Sciences, A.S. Teacher Educ. Specialization	Ashley Wilkins, MA	X	
	Substance Abuse Rehab. Counselor Certificate	Chandell Miller, AL	X	
Engineering and Applied Technology Sam Hill, WO Abe Eftekhari, AN	Air Conditioning & Refrigeration, A.A.S.	John Meeker, WO	X	
	Architecture Technology, A.A.S.	Armen Simonian, AN	X	
	Automotive Technology, A.A.S.	Myles Embrey, MA	X	
	Construction Management Technology, A.A.S.	Tracy Wright, AL	X	
	Engineering, A.S.	Rudy Napisa, AN		X
	Welding: Basic Techniques Career Studies Certificate*	Matthew Wayman, MA	-	-
General Studies, General Education Global Studies AVP Sharon Robertson, AN, Barbara Hopkins, AN	General Studies, A.S.**	Allison McElfresh, AN	X	X
Health Sciences Nicole Reaves, ME Shelly Powers, ME	Dental Assisting A.A.S.	Sumera Rashid, ME	X	
	Dental Hygiene, A.A.S.	Marina McGraw, ME	X	
	Diagnostic Medical Sonography, A.A.S.	Judi Green, ME	X	
	Emergency Medical Services, A.A.S.	Gary Sargent, ME	X	
	Health Information Management, A.A.S.	Dana Pratt, ME	X	
	Medical Laboratory Technology, A.A.S.	Maria Torres-Pillot, ME	X	
	Medical Laboratory Technology: Phlebotomy, C.S.C.	Maria Torres-Pillot, ME	X	
	Occupational Therapy Assistant, A.A.S.	Kathi Skibek, ME		X
	Personal Training Career Studies Certificate	Dahlia Henry-Tett, MA	X	
	Physical Therapist Assistant, A.A.S.	Jody Gundrum, ME		X
	Radiography, A.A.S.	Jarice Risper, ME		X

Pathway Provost & Dean	Program/Certificate	Faculty Chair/ Assessment Lead	Core Competency	
			PR	SL
	Respiratory Therapy, A.A.S.	Donna Oliver-Freeman, ME	X	
	Veterinary Technology, A.A.S.	Kiana Adkisson-Selby, LO	X	
Information & Engineering Technologies Chad Knights, AN Paula Ford, WO	Cybersecurity, A.A.S.	Margret Leary, AL	X	
	Engineering Technology, A.A.S.	John Sound, MA	X	
	Information Technology, A.S.	Judi Bartlett, WO	X	
	Information Systems Technology, A.A.S.	Judi Bartlett, WO	X	
Languages Pamela Hilbert, AN Jennifer Daniels, AN	American Sign Language to Eng. Interpretation	Paula Reece, AN	X	
	Professional Writing Certificate	Jennifer Nardacci, AN	X	
Life Sciences Julie Leidig, LO Diane Mucci, MA	Biotechnology, A.A.S.	Xin Zhou, MA	X	
	Horticulture Technology, A.A.S.	Anders Vidstrand, LO	X	
Liberal Arts & Communications Pamela Hilbert, AN Jimmie McClellan, AL	Liberal Arts, A.A.**	--	X	X
Mathematics & Computer Science Sam Hill, WO Alison Thimblin, WO	Computer Science, A.S.	Larry Shannon, AN		X
	Science, A.S. Mathematics Specialization	--		X
Nursing & Surgical Technologies Nicole Reaves, ME Laura Dickson, ME	Nursing, A.A.S.	Brenda Clark, ME	X	
Physical Sciences Julie Leidig, LO Barbara Canfield, LO	Science, A.S.**	Mitra Jahangeri, LO	X	X
Social Sciences, Molly Lynch, MA Katherine Hitchcock, LO	Psychology, A.S.	Karen Livesey, AN		X
	Public History & Historic Preservation Career Studies Certificate	Marc Dluger, LO	X	
	Social Sciences, A.S.**	--	X	X
	Social Sciences, A.S. Geospatial Specialization	Michael Harman, LO	X	
Visual, Performing & Media Arts Annette Haggray, AL David Epstein, WO	Cinema A.F.A	Bryan Brown, WO	X	
	Graphic Design, A.A.S.	Dwayne Treadway, LO	X	
	Interior Design, A.A.S.	Kristine Winner, LO	X	
	Liberal Arts: Theatre, C.S.C.	Nathan Carter, AL	X	
	Music, A.A., A.A.A. Specialization	Lisa Eckstein, AL	X	
	Music Recording Technology Certificate	Sanjay Mishra, LO	X	
	Photography and Media, A.A.S.	Aya Takashima, AL	X	
	Visual Art, A.F.A.	Fred Markham, AL	X	

*Did not receive CLO.

**As multi-disciplinary degrees use the assessments of the disciplines that support them, their reports are not compiled here.

CORE COMPETENCY ASSESSMENT REPORT: 2019-2020

Submitted by Disciplines without Degrees or Certificates: 2019-2020

Table 2. Discipline Pathway Provost, Deans, and SLO Lead Faculty: 2019-2020 Core Competency Assessed

Pathway Provost & Dean	Discipline	Faculty Department Chair/ Assessment Lead	Core Competency	
			PR	SL
Languages Pamela Hilbert, AN Jennifer Daniels, AN	English*	LeeAnn Thomas, WO	-	-
	World Languages: Chinese Spanish	Martha Davis, AL	X	
Liberal Arts & Communications Pamela Hilbert, AN Jimmie McClellan, AL	Liberal Arts: Art History Specialization	Stephanie Thornton-Grant, AN	X	
	Communication	Amy Hileman, LO	X	
	Philosophy	Steven Stakland, AN		X
	Religion	Ann Stegner, AN; Joel Harrison, MA	X	
Life Sciences Julie Leidig, LO Diane Mucci, MA	Biology	Karla Henthorn, AN		X
Physical Sciences Julie Leidig, LO Barbara Canfield, LO	Chemistry	Pirabalini Swaminathan, AN (Chair) Mitra Jahangeri, LO (Assessment Lead) Beth Schomber (Compiled Report)		X
	Geology	William Bour, LO		X
	Physics	Tatiana Stantcheva, AL (Chair) Francesca Viale, LO (Assessment Lead)		X
Social Sciences Molly Lynch, MA Katherine Hitchcock, LO	Economics	Ed Creppy, LO		X
	Geography	Melinda Alexander, AL	X	
	History	Jennifer Winters, AN	X	
	Political Science***	Jack Lechelt, AL	-	-
	Sociology	Erica Smith, AN (Chair) Nelson Kofie, LO (Assessment Lead)		X
Student Development (SDV) Molly Lynch, MA Ellen Fancher-Ruiz, AN	SDV	Margarita Martinez, AN	X	

***Assessed another CLO, Civic Engagement

Scientific Literacy
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Program and Select Certificates 1
- Business Management, A.A.S. 1
- Computer Science, A.S. 3
- Engineering, A.S. 4
- General Studies: Health Sciences Specialization, A.S. 6
- Occupational Therapy Assistant, A.A.S. 8
- Physical Therapist Assistant, A.A.S. 10
- Psychology, A.S. 12
- Radiography, A.A.S. 14
- Science: Mathematics Specialization, A.S. 15

Disciplines 17
- Biology 17
- Chemistry 19
- Economics 22
- Geography 24
- Geology 25
- Physics 26
- Sociology 28

Program and Select Certificates

Core Competency Assessment Report: Scientific Literacy, 2019-2020

Business Management, A.A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The Associate of Applied Science degree curriculum in Business Management is designed for persons who seek employment in business management or for those presently in management who are seeking promotion. The occupational objectives include administrative assistant, management trainee, department head, branch manager, office manager, manager of small business, and supervisor.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: Students will recognize and know how to use the scientific method, and to evaluate empirical information.

Assessment Methods

Course Name/Number: Introduction to Business Statistics - BUS 220

Direct Measure Used: A dataset was given. The question asked students to use a specific statistical method to answer whether the dataset is at least approximately correct for that statistical method.

CLO/Rubric Criteria or Question Concepts: Criteria:

a) Articulate a science-related issue: The student can connect a clear issue and explain the connection between the issue and science content.
b) Identify evidence: The student can use evidence (data/statistics) relevant to the question.
c) Organization: The student can clearly communicate their argument to the intended audience.

Sample:

Campus/ Modality	# Sections Offered	# Sections Assessed	# Students Assessed
MA	1	0	0
Online	2	2	9
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**3**	**2**	**9**

Assessment Results

Semester/year data collected: Spring 2020 (COVID-19)

Target: See the Table below:

CLO Criteria	Will earn Advanced or Proficient
Articulate a science-related issue	80% or more
Identify evidence	80% or more
Organization	80% or more

Results by CLO Criteria: Percent of Students > target per criteria

Results by CLO Criteria/ Question Concepts	Results Spring 2020
1. Articulate a science-related issue	89% scored advanced or proficient
2. Identify evidence	78% scored advanced or proficient
3. Organization	66% scored advanced or proficient

Results:

- CLO Criteria "articulate a science-related issue": Of these 9 responses, 89% were graded advanced or proficient. The target (80%) was met.
- CLO Criteria "identify evidence": Of these 9 responses, 78% were graded advanced or proficient. The target (80%) was not met.
- CLO Criteria "organization": Of these 9 responses, only 66% were graded advanced or proficient. The target (80%) was not met.

Target Met: [ ] Yes [ ] No [X] Partially

Use of Results

1. Changes put in place since previous assessment to improve student learning: This CLO was assessed for the first time.

2. Impact of changes on current results: This CLO was assessed for the first time.

3. According to current results, areas needing improvement: Areas of improvement on data collection/reporting

- To remove/decrease non-response bias, the faculty must cooperate to collect and report SLO/CLO assessment data. The data was not received from the on-campus section.

The target is missed for CLO criteria "organization"

- The target was not met for CLO criteria: organization. The target was 80% of the students would earn advanced or proficient. The actual result was only 66%.

COVID related issues: The on-campus faculty could not give the assessment due to the pandemic. The on-campus class was moved to remote learning in mid-March 2020.

4. Based on current results, new actions to improve student learning:

Actions to improve performance on the CLO criteria "identify evidence" and "organization": The Discipline Group discussed these results at the Fall 2020 meeting and agreed (beginning Fall 2020) to the following actions to improve results:

	Current Results improved vs. Previous Results: [ ] Yes [ ] No [ ] Partially [X] N/A - This CLO was assessed for the first time. **Areas where students met the target:** The target was met for CLO criteria: articulate a science-related issue. The target was 80% of the students would earn advanced or proficient. The actual result was 89%. **Areas where students did NOT meet the target:** The target was barely missed for CLO criteria: identify evidence. The target was 80% of the students would earn advanced or proficient, but the actual result was 78%. The target was not met for CLO criteria: organization. The target was 80% of the students would earn advanced or proficient. The actual result was only 66%.	• Spend more time teaching numerical measures: mean and standard deviation • Spend more time teaching empirical rule • Use interactive classroom exercises • Encourage students to use Canvas Online Tutoring: English writing skills **5. Next assessment of this CLO:** Not decided yet.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Computer Science, A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The curriculum is designed primarily for students who wish to transfer to a four-year college or university to complete a baccalaureate degree in computer science. The curriculum emphasizes the study of the science of computing and the use of computing in a scientific setting.

Core Learning Outcome: **[ ] Professional Readiness** **[X] Scientific Literacy**
Operationalize your CLO here: Demonstrate techniques for problem analysis and algorithm design.

Assessment Methods

Course Name/Number: Introduction to Computer Science - CSC 200

Direct Measure Used: Programming Project

CLO/Rubric Criteria or Question Concepts: Each criterion used a rubric that divided the score into three marks indicating 80% or better understanding, 60% or better understanding, and less than 59.99% understanding. The marks used were 2,1, and 0. These marks were normalized to 3, 2, and 1 and then the formula: score / 3 * 100 was applied to obtain normalized averages that corollate with scales used in other assessments in this report.

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	2	1	20
AN	8	5	88
MA	3	2	40
ME	N/A	N/A	N/A
LO	2	1	24
WO	2	1	24
Online	5	2	30
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**22**	**12**	**226**

Assessment Results

Semester/year data collected: Spring 2020

Target: To achieve an average of 80% competency across all students assessed.
Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Spring 2020
All students assessed (weighted average)	90.77
On-campus average	90.89
Online average	89.99

Results by CLO Criteria: Average/Mean Score per criteria

Results by SLO Criteria/ Question Concepts	Results Spring 2020
1. Student identifies key concepts in the problem.	91.32
2. Student creates an algorithm that solves the problem	90.69
3. Student tests the solution by implementing the algorithm in a high-level programming language	90.29

Target Met: [X] Yes [ ] No [ ] Partially
Current Results improved vs. Previous Results: [ ] Yes [ ] No [ ] Partially [X] N/A - This is the first time that Scientific Literacy was measured as a core learning outcome in a Computer Science course.

Areas where students met the target: On average, students met target for each of the criteria.

Use of Results

1. Changes put in place since previous assessment to improve student learning: This is the first semester that Scientific Literacy was measured in a Computer Science course, so we used an existing SLO "Demonstrate techniques for problem analysis and algorithm design."
3. According to current results, areas needing improvement: It is difficult to assess how we might change this assessment based on the results. Overall, the results appear to be good. During the consolidation and analysis of the raw assessment data, it is noted that some data sets in assessment submissions did not appear to distinguish the difference in results where students totally failed an assessment from those results where students did not participate in the assessment. In other result submissions it appears that students that did not participate in assessments were not included in the results. Computer Science (CS) courses have a high drop rate and these results do not adequately address the skill level of those students that drop the course prior to assessment, nor those students who elected not to participate in the assessment. Nor do these assessments distinguish between students who take these courses as a major requirement from those who are taking the course as a non-major elective. There is a need to distinguish between the various categories of students who take CS courses. The current assessment appears to be biased toward those students who are doing well and chose to participate in the assessment process.
4. Based on current results, new actions to improve student learning: The Computer Science discipline will discuss the results during the Fall 2020 semester and decide if assessments should be administered after the withdrawal date to collect more robust data.
5. Next assessment of this CLO: Spring 2023

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Engineering, A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The curriculum is designed to prepare the student to transfer into a baccalaureate degree program in engineering fields such as mechanical engineering, civil engineering, chemical engineering, aeronautical engineering, and naval architecture/marine engineering.

Core Learning Outcome: **[ ] Professional Readiness** **[X] Scientific Literacy**
Operationalize your CLO here: Student will apply and demonstrate engineering problem solving methodology. The CLO used in this assessment is also an SLO of the program.

Assessment Methods

Course Name/Number: Solid Mechanics - Statics – EGR 240

Direct Measure Used: EGR 240 Solid Mechanics – Statics assessment of students successfully solving key Solid Mechanics-Statics problem as described below.

CLO/Rubric Criteria or Question Concepts:
1. Students will correctly identify all reactions and correctly draw the free-body diagram.
2. Students will who correctly apply the equations of static equilibrium for a rigid body.
3. Students will correctly solve the engineering mechanics problem defining vector of forces in 3D or questions of vector cross product.

Assessment Results

Semester/year data collected: Fall 2019 and Spring 2020

Target: 60% on each of the CLO Criteria/Question Concepts

Results: Note: The data acquired was for the individual SLO Criteria/ Question Concepts and no Overall Average/Mean Score was collected.

Results by CLO Criteria – Current Results: Percent of Students > target per criteria

Results by SLO Criteria/ Question Concepts	Current Results	
	Spring 2020	Fall 2019
1. Number of students who correctly identified all reactions and correctly drew the free-body diagram.	71%	77%
2. Number of students who correctly applied the equations of static equilibrium for a rigid body.	60%	67%
3. Number of students who correctly solved the problem.	44%	44%
Average	**58%**	**63%**

Results by CLO Criteria – Previous Results:
Average/Mean Score per criteria

Results by SLO Criteria/ Question Concepts	Previous Results Spring 2019
1. SLO 1 - Part A Defining vectors of forces in 3D	78%
2. SLO 1 - Part B Solving the problem using simultaneous equations of 3 unknowns and 3 equations.	56%
3. SLO 2: Solving 3 questions of vector cross product • One Problem	82% 66%

Use of Results

1. Changes put in place since previous assessment to improve student learning: In the previous assessment, the EGR 240 instructors recommended that the SLO assessment instrument be revised. The revised SLO Criteria/Question Concepts focus on correctly identifying the reactions, drawing of the free-body diagram, applying the equations of equilibrium, and solving the problem correctly. It was also recommended that mechanics instructors emphasized problem solving procedures in calculating moments using cross products and include the alternate algebraic procedure. Mechanics instructors also spent time in discussing the fundamentals: math applications to 3D geometry, i.e., solving systems of equations using matrices.

2. Impact of changes on current results: In Fall 2019, when the course was delivered in person, SLO Criteria/Question Concepts 1 and 2 met the target. However, in SLO Criteria/Question Concepts 3, where the students are required to correctly solve the problem, the result falls below the target. Comparing the data from the Fall 2019 to Spring 2020 when the course was delivered partially remote, the Spring 2020 SLO Criteria/Question Concepts 1 and 2 results dropped slightly from Fall 2019. The average of the SLO Criteria/Question Concepts in both Fall 2019 and Spring 2020 did not meet the target.

3. According to current results, areas needing improvement: Results from SLO Criteria/Question Concepts 3 needs to be improved. Even with the slight decline in the SLO Criteria/Question Concepts 1 and 2, where the students were able to analyze and set-up the problem, the students fell short in solving the problem completely. The difference in the modality of the course delivery did not influence the outcome of the SLO Criteria/Question Concepts.

4. Based on current results, new actions to improve student learning: In both Fall 2019 and Spring 2020 SLO Criteria/Question Concept 1, the students were able to demonstrate their knowledge of scientific facts, concepts,

Engineering, A.S.

Sample: Fall 2019

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	1	1	23
AN	2	2	28
MA	1	1	11
LO	1	1	22
Online	N/A	N/A	N/A
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**5**	**5**	**84**

Sample: Spring 2020

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	1	1	31
AN	1	1	12
MA	1	1	17
LO	1	1	13
Online	N/A	N/A	N/A
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**4**	**4**	**73**

• Two Problems • Three Problems	65%
Average	**69%**

Target Met: [ ] Yes [X] No [ ] Partially

Current Results improved vs. Previous Results:
[ ] Yes [X] No [ ] Partially [ ] N/A

Narrative comparison of current results to previous results: One of the recommendations from the previous report was to revise the assessment questions for this year's assessment. The new assessment questionnaire showed that in Spring 2020, there was an average of 58% compared to 69% from the last year's data, a decrease of 11%.

Also shown is a comparison of the Fall semester 2019 and Spring 2020. In the Spring 2020 due to COVID-19, half of the semester was delivered remotely including the examinations. The results showed a decrease of 5% in the average of the SLO Criteria/Question Concepts.

Areas where students met the target: Only SLO Criteria/Question Concepts 1 and 2 met the target in both Fall 2019 and Spring 2020.

Areas where students did NOT meet the target: The SLO Criteria/Question Concepts 3 did not meet the target in both semesters.

principles, and theories, one of the components of scientific literacy. In the second SLO Criteria/Question Concept, though in the Spring 2020, students fell short in meeting the target, still a significant number of students were able to utilize the processes of scientific inquiry through the applications of the equations of static equilibrium for a rigid body.

The following are the recommended actions to improve the student learning outcome: Mechanics instructors need to determine the reason for students' inability to solve the problems correctly, even when they can correctly identify the reactions, draw the free body diagrams, and apply the equations of equilibrium. Knowing where the shortcomings are, the mechanics instructors will be able to provide lectures that focus on the students' inabilities to correctly solve the engineering mechanics problems.

Also, we will continue to use the revised SLO Criteria/Question Concepts to acquire more data for comparison and analyses. Using the same assessment instrument, analyze the effects of the change in course delivery from traditional in-person class to remote synchronous lectures and exams. Lessons learned in the remote delivery that contributes to improvements in student learning outcomes will be introduced and applied to the traditional in-class course delivery when the course delivery returns to normal.
Delivering lectures remotely allows video recording which can be reviewed in detail. Interactions captured through video will allow the development of additional lectures to reinforce the previous discussions. Instructors can review and refine their presentations after each lecture and at end of the semester to ensure that the next course delivery is improved.
The Pathways Dean of Engineering, the Engineering Discipline Group Chair, the Engineering Steering Committee, and the Engineering Mechanics instructors will be responsible for implementing the recommendations in Spring 2021. The final APER report will be shared with the Engineering Faculty, which includes both full-time EGR 245 instructors upon completion. This will ensure that they are familiar with the recommendations and their roles in implementing the improvement initiatives. The Engineering Discipline Group will also discuss the recommendations in their beginning the of the semester meeting in Spring 2021.

5. Next assessment of this CLO: Spring 2022

Core Competency Assessment Report: Scientific Literacy, 2019-2020
General Studies: Health Sciences Specialization, A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The academic foundation in this degree will allow students to continue their education by applying to a competitive program at the Medical Education Campus or prepare for entry to a variety of allied health or health sciences baccalaureate programs. Students should consult an academic advisor in selecting electives to this curriculum.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: Students will demonstrate the ability to apply the scientific method and to evaluate empirical information.

Assessment Methods

Course Name/Number: General Biology I - BIO 101

Direct Measure Used: BIO 101 Scientific Method SLO Quiz

CLO/Rubric Criteria or Question Concepts: On the BIO 101 Scientific Method quiz, the results of how students answered the following questions were used to assess the students' ability to demonstrate and apply the scientific method and to evaluate empirical information:

Questions:
#1: Steps of the scientific method
#2: Hypothesis
#3: Hypothesis
#4: Control groups
#5: Data
#6: Hypothesis
#7: Dependent/Independent variable
#10: Null hypothesis

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	12	12	148/ 333
AN	32	32	345/ 840
MA	16	16	176/ 358
ME	N/A	N/A	N/A
LO	18	18	186/ 527
WO	15	15	177/ 414
Online	3	3	80/ 71*
Off-Site Dual Enrollment	22	22	191/ 422
Total	**118**	**118**	**1303**/ 2965**

Assessment Results

Semester/year data collected: Fall 2019

Target: 90% of students will be able to be able to apply the scientific method and evaluate empirical information as assessed through 8 questions from the BIO 101, Scientific Method SLO Quiz.

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Fall 2019
All students assessed (weighted average)	92.9%
On-campus average	92.6%
Online average	92.8%
Dual Enrollment average	94.1%

Results by CLO Criteria:
[ ] Average/Mean Score per criteria or
[X] Percent of Students > target per criteria

Results by SLO Criteria/ Question Concepts	Results Fall 2019
Question #1	95%
Question #2	95%
Question #3	95.8%
Question #4	87.4%
Question #5	97%
Question #6	86%
Question #7	94.3%
Question #10	94.9%

Target Met: [ ] Yes [ ] No [X] Partially

Current Results improved vs. Previous Results:
[ ] Yes [ ] No [ ] Partially [X] N/A

Use of Results

1. Changes put in place since previous assessment to improve student learning: Since the General Studies, Health Sciences Specialization A.S. degree is new, beginning in Fall 2019, this CLO was assessed for the first time.

2. Impact of changes on current results: N/A - Since this is a new degree pathway, launching in Fall 2019, this CLO was assessed for the first time.

3. According to current results, areas needing improvement: Overall, students demonstrated the ability to apply the scientific method and to evaluate empirical information. Continued emphasis on the importance of the use of a control group in an experiment is recommended. Additionally, being able to effectively identify examples of a scientific hypothesis is necessary when demonstrating the ability to apply the scientific method. As a health sciences student, being able to apply the scientific method and evaluate empirical information is a critical skill. The Associate Dean of Health Sciences will collaborate with the BIO Head to identify a method to specifically identify the General Studies, Health Sciences Specialization students who take this quiz in preparation for future assessments. If this is not possible, then a Health Sciences course will need to be chosen instead of BIO 101 to assess this CLO in the future.

4. Based on current results, new actions to improve student learning: Based on the current results, it is recommended that students enrolled in BIO 101 complete an assignment in lecture or lab that reiterates the importance of the use of a control group in an experiment and demonstrates what happens when a

*80 students responded “Yes” to the question “Do you take most of your classes through NOVA Online?” when only 71 students were registered for BIO 101 through NOVA Online. The discrepancy is due to error associated with students self-reporting their NOVA Online status. This question has been changed for the SLOs/ CLO given in 2020-2021 to ask “Are you taking BIO 101 as a NOL student?” ** All students in the BIO 101 courses were asked to take the BIO 101 Scientific Method Quiz on a Canvas site and a total of 1303 students took this quiz.	**Narrative comparison of current results to previous results:** Since the General Studies, Health Sciences Specialization A.S. degree pathways is new, launching in Fall 2019, there are no previous results to do a comparison with the current data. **Areas where students met the target:** Based on the data from the BIO 101 Scientific Method Quiz, students met the target of 90% or greater when having to identify the steps of the scientific method, when defining a hypothesis, when applying the term scientific validity as related to a hypothesis, when defining data, when applying their understanding of an independent variable, and when demonstrating understanding of how to evaluate empirical information as related to a hypothesis. **Areas where students did NOT meet the target:** Based on the data from the BIO 101 Scientific Method Quiz, students did not meet the 90% threshold on 2 of the questions. One question was related to the use of control groups in an experiment (question #4). Additionally, when students were asked to identify an example of a scientific hypothesis (question #6), the target was missed by 4%.	control group is lacking. Further, having students write their own scientific hypotheses and share them with their peers is recommended so that students are being exposed to a variety of examples of scientific hypotheses, important when applying the scientific method. All faculty teaching BIO 101 will be informed of the data collected to improve student learning. **5. Next assessment of this CLO:** This CLO will be reassessed in AY 2022-2023.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Occupational Therapy Assistant, A.A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program Purpose Statement: The program is designed to provide students with the philosophical, theoretical, and clinical knowledge necessary to provide quality occupational therapy. This curriculum is designed to prepare students to assist and collaborate with occupational therapists in providing occupational therapy treatments and procedures. Students will participate in classroom and fieldwork experiences in this program. Upon successful completion of the program, graduates must take and pass a national board exam and complete the licensing process in order to begin their career as an Occupational Therapy Assistant. Graduates may, in accordance with state laws, assist in development of treatment plans; carry out routine functions, direct activity programs, and document the progress of treatments.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy
Operationalize your CLO here: Implement evidence-based practice skills when working with clientele across the life span.

Assessment Methods

Course Name/Number: Topics in Evidence Based Practice in Occupational Therapy - OCT 195

Direct Measure Used: Critically Appraised Topic Paper Rubric Score: The Critically Appraised Topic (CAT) is a standard process in Occupational Therapy research. The students completed a CAT during the OCT 195 course as a group. This CAT requires students to implement their evidence-based skills that they acquired throughout the semester in OCT 195 Topics in Evidence Based Practice in Occupational Therapy.

SLO/Rubric Criteria or Question Concepts: Students were required to choose an evidence-based practice topic and a specific targeted sample of clients of their choice (with a particular diagnosis, age category any place across the lifespan, a cultural category as relevant, and a particular OT treatment approach) to perform an exhaustive search of the evidence to answer their research question. The students then were required to categorize the evidence based on quality and draw conclusions on the best practices when working with their chosen specific clientele. Students wrote a CAT paper and presented this information to the class. OTA program Grading Scale:

- A= 90.00-100
- B=80.00-89.99

Assessment Results

Semester/year data collected: Summer 2020

Target: 80% of the NOVA OTA students will receive an A (90-100%) on the CAT paper rubric, demonstrating effectiveness at utilizing evidence-based practice skills needed to be an informed OTA practitioner.

Results: In the Summer 2020, 100% of the second-year students of the OTA program completed the CAT paper in the OCT 195 Topics in Evidence Based Practice in Occupational Therapy course. This semester was run remotely due to COVID.

CAT Paper Grade	(2020): % of students with this grade	(2016): % of students with this grade
A	100%	81.2%
B	0%	18.8%
C	0%	0%
D	0%	0%
F	0%	0%

Target Met: [X] Yes [ ] No [ ] Partially

Current Results improved vs. Previous Results:
[X] Yes [ ] No [ ] Partially [ ] N/A

Narrative comparison of current results to previous results: 100% of the students met the target in this assessment (2020) which is an improvement as compared to the previous assessment (2016).

Areas where students met the target: All of the 17 students who completed the evidence-based practice paper that included an exhaustive search of the evidence received an “A” showing an

Use of Results

1. Changes put in place since previous assessment to improve student learning: This was the second year for the current professor teaching this course. During each summer session, the Program Director, also the professor of the OCT 195 Topics in Evidence Based Practice in Occupational Therapy course, spent increased time on instruction on specifically reviewing the components of the CAT, including: the study design, outcome measures, the main findings, and interpretation of the results**.** Additional library assistance was provided by the librarian to assist students in: developing PICO questions; selecting appropriate data bases; and understanding the research pyramid and CEBM system to evaluate the research articles.

2. Impact of changes on current results: The OTA scores are consistently improving as students are provided with additional instruction and support.

3. According to current results, areas needing improvement: Understanding and translating the results section within a quantitative and qualitative research article tends to be challenging for students. Although the students are doing well with this topic, it is felt that more instruction especially with understanding research methods, identifying the best evidence, and translating this information into how it can be used in the clinic should be the focus for faculty.

4. Based on current results, new actions to improve student learning: Based on the current results, the program is going to continue to work with the librarian to provide students with appropriate guidance to evaluate

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- C=75.00-79.99
- D=70.00-74.99
- F=<70

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
ME only: OCT 195	1	1	16
Online	N/A	N/A	N/A
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**1**	**1**	**16**

</td>
<td>overall excellent understanding and application of the evidence-based practice process in OT.</td>
<td>research articles, use appropriate databases, and more effectively instruct on research methods and understand research terms for Summer 2021. Additionally, all OTA Faculty will incorporate discussions of research articles in all coursework to help the students feel more comfortable with reading and applying research articles to OT practice.

5. Next assessment of this CLO: This SLO will be reassessed in the AY 2021-2022.</td>
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Core Competency Assessment Report: Scientific Literacy, 2019-2020
Physical Therapist Assistant, A.A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The program is designed to prepare students to utilize exercise, specialty equipment, and other treatment procedures to prevent, identify, correct, and alleviate movement dysfunction. The program design provides students with the philosophical, theoretical, and clinical knowledge necessary to deliver high-quality patient care. Ultimately, students are prepared as skilled technical healthcare providers who work under the direction and supervision of a physical therapist to provide selected components of physical therapy treatments. Upon successful completion of the program, students must take and pass a licensing examination to begin their career as a physical therapist assistant (PTA). Students are prepared for employment in a variety of healthcare settings, including acute care hospitals, outpatient clinics, extended care facilities, rehabilitation centers, contract agencies, and schools.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: SLO #6 Identify career development and lifelong learning opportunities: Identify and integrate appropriate evidence based resources to support clinical decision-making in patient care.

Assessment Methods

Course Name/Number:

- Clinical Education III - PTH 232
- Therapeutic Procedures I - PTH 121
- Kinesiology for the Physical Therapist Assistant (PTA) - PTH 115
- Professional Issues - PTH 245

Direct Measure Used – Summative Assessment: The summative evaluation method is performance on Criterion #6 Self-Assessment and Life Long Learning on the PTA Clinical Performance Instrument (CPI) in PTH 232 Clinical Experience III in the Spring semester of the second year. Clinical instructors are assessing the students' ability to recognize and address the areas in which they need to improve and grow. One of the listed skills for the Self-Assessment and Life Long Learning criterion is: "Seeks current knowledge and theory (in-service, education, case presentation, journal club, projects) to achieve optimal patient care." In order to perform each of these listed skills, students must be able to access and assess the pertinent evidence-based literature. Per the CPI, the criteria which must be met in order for a student to achieve "entry level performance" are:

- Is capable of completing tasks, clinical problem solving, and interventions/data collection for patients with simple or complex conditions under general supervision of the physical therapist
- Is consistently proficient and skilled in simple and complex tasks, clinical problem solving, and interventions/data collection
- Is capable of maintaining 100% of a full-time PTA's patient care workload in a cost-effective manner with direction and supervision from the physical therapist.

Assessment Results

Semester/year data collected:

- PTH 232: Fall 2019 for the Classes of 2020 and 2021, and Summer/Fall* 2020 for the Class of 2020
- PTH 121: Fall 2019
- PTH 115: Spring 2020
- PTH 245: Spring 2020

*Students' final PTH 232 clinical experience scheduled for Spring 2020 was delayed by Covid-19

Summative Assessment Target: 100% of students will score "Entry Level" on PTH 232 CPI criterion #6

Summative Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Fall 2019, Summer/Fall 2020	Results Spring 2019
All students assessed (on-campus only)	96.7%	100%

Formative Results by CLO Criteria: Average/Mean Score per criteria

Results by SLO Criteria	Fall 2019/ Spring 2020	Fall 2018/ Spring 2019
4. Hierarchy of Evidence (PTH 121)	68%	82%
5. Accessing relevant EBP article (PTH 115)	100%	100%
6. Evidence Based Practice application research paper (PTH 245)	91.9%	Not available* Spring 2019

*In the shift from Blackboard to Canvas, Blackboard courses from previous years were archived but grades could not be later accessed.

Use of Results

1. Changes put in place since previous assessment to improve student learning: In Fall 2018, students in the Class of 2020 in Therapeutic Procedures I-PTH 121 performed poorly on an evidence-based practice quiz following the lecture. The instructor created a second power point for the students and reviewed the material with them prior to the written exam. For Fall 2019, the instructor presented only the revamped power point and did not have a special review session of the material. In Spring 2020, the previous group project in Kinesiology for the PTA-PTH 115 was retooled as an individual project in which each student independently located an applicable evidence-based article.

2. Impact of changes on current results: Students in the Class of 2021 in Therapeutic Procedures I-PTH 121 had more difficulty correctly identifying types of evidence without instructor review and reinforcement. The same students in the following semester were able to independently procure an appropriate full text journal article and correctly relate it to their patient problem in the Kinesiology for the PTA-PTH 115 individual posture project assignment. Students in the Class

"Entry level" is the single point highest level terminal benchmark without gradations. Students achieving this benchmark are deemed ready to practice as physical therapist assistants. There are no strengths or weaknesses defined or identified for individual criterions on this national performance assessment tool.

CLO/Rubric Criteria or Question Concepts – Formative Assessments: The focus of this CLO was on identifying and integrating evidence based resources to support clinical decision-making. Performance on written exam questions and an assigned project in the first year and a research paper in the second year that required students to understand evidence-based practice concepts and to access journal articles in order to support treatment decisions were examined. The formative evaluation methods included:

1. In Therapeutic Procedures I- PTH 121 in the first semester in Fall 2019 for the Class of 2021: 37 students were asked 3 written exam questions to determine their understanding of each of the types of studies in the hierarchy of evidence and their relative strengths.
2. In Kinesiology for the PTA-PTH 115 in the second semester in Spring 2020 for the Class of 2021: the Assessment portion of the Posture Project assignment required 32 students to locate a relevant recent peer-reviewed research article to either enhance their understanding of the patient's deficit or support their treatment choice.
3. In Professional Issues-PTH 245 in the fifth semester in Spring 2020: 32 students in the Class of 2020 submitted an evidence-based research paper as their capstone project. They developed a PICO question and then searched for a randomized controlled trial study that addressed their question. The paper focused on a description and discussion of their article.

Sample:

Campus/ Modality: ME only	Total # of Sections Offered	# Sections Assessed	# Students Assessed
PTH 232	1	1	30
PTH 121	1	1	37
PTH 115	1	1	32
PTH 245	1	1	32
Online	N/A	N/A	N/A
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**4**	**4**	**131**

Target Met: [ ] Yes [X] No [ ] Partially

Current Results improved vs. Previous Results:
[ ] Yes [X] No [ ] Partially [ ] N/A

Narrative comparison of current results to previous results: 1 student out of 30 in the Class of 2020 did not achieve the entry-level criteria for Self-Assessment and Life Long Learning in Clinical Experience III-PTH 232 and failed the course. All students achieved the entry-level target in the Class of 2019. Although the failing student's deficits were global, clinical decision making was identified as the single most significant deficit.

Areas where students met the target: All but one student achieved the target of entry level in Self-Assessment and Life Long Learning in the final clinical experience. Students in Therapeutic Procedures I-PTH 121 performed well on one of the 3 written exam questions, with 95% correctly choosing the weakest type of study from among several in the hierarchy of evidence. 100% of students were able to access an appropriate full text article that supported either their data collection or their intervention choices in their posture project in Kinesiology for the PTA-PTH 115. Although the scores were identical to the previous cohort's, the projects in 2019 were individual rather than the group as they had been in 2018. The class average was in the A grade range for the capstone evidence-based practice research paper, with the majority of students asking a strong PICO question and accessing and competently discussing a high-quality article.

Areas where students did NOT meet the target:
Students in Therapeutic Procedures I-PTH 121 picked the incorrect answer for 2 of the written exam questions more often than students in the previous cohort (59% vs 73% for one, 51% vs 81% for the other). Both questions required them to identify the type of study described.
Although most students in Professional Issues-PTH 245 did well on their capstone projects, one student scored below 80 and a second student scored below 75, which is a failing grade in the PTA program. It should be noted that the failing student received and incorporated feedback on the paper and subsequently presented it at an in-service in the final clinical experience.

of 2020 performed well on the capstone project in Professional Issues-PTH 245.

3. According to current results, areas needing improvement: Students continue to need reinforcement in order to correctly identify the types of evidence-based practice studies.

4. Based on current results, new actions to improve student learning: The Therapeutic Procedures I-PTH 121 instructor will resume reinforcement and review of the hierarchy of evidence with students. At the end-of-the-year faculty planning meeting, core faculty will continue to review and assess how evidence based practice concepts are threaded throughout the curriculum. At the annual meeting between the program director and each of the second-year adjunct faculty teaching PTH 225-Rehabilitation Procedures and PTH 227-Pathological Conditions, discussion of student performance on assignments in which evidence based practice is integrated will continue.

5. Next assessment of this CLO: Spring 2021

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Psychology, A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: This curriculum is designed for students who plan to transfer to a college or university for a BS or BA degree in psychology.

Core Learning Outcome: **[ ] Professional Readiness** **[X] Scientific Literacy**

Operationalize your CLO here: Students will correctly identify the steps of the scientific method and will display knowledge about the evaluation of empirical information.

Assessment Methods

Course Name/Number: Principles of Psychology - PSY 200

Direct Measure Used: Scientific literacy CLO: Students took a 10-question multiple choice assessment about the steps of the scientific method and how to evaluate empirical information.

CLO/Rubric Criteria or Question Concepts: Steps on the scientific method and evaluating empirical information.

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	7	2	57
AN	15	8	167
MA	14	8	187
ME	0	0	106
LO	17	7	0
WO	8	3	120
Online	13	3	78
Off-Site Dual Enrollment	1	1	18
Total	**75**	**32**	**733**

Assessment Results

Semester/year data collected: Spring 2020

Target: 70% of the students will pass with a 70% or higher

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Spring 2020
All students assessed (weighted average)	49% passed with 70% or higher Mean = 62%
On-campus average	62%
Online average	54%
Dual Enrollment average	78%

Results by CLO Criteria:

Percent of Students > target per criteria

Results by SLO Criteria/ Question Concepts	Current Results Spring 2020
1. Steps Scientific Method	53%
2. Evaluating Empirical Information	54%

Target Met: [ ] Yes [X] No [ ] Partially

Current Results improved vs. Previous Results:

[ ] Yes [ ] No [ ] Partially [X] N/A - First Assessment of this CLO.

Areas where students met the target: None

Areas where students did NOT meet the target: Steps of the Scientific Method and Evaluating empirical evidence.

Use of Results

1. **Changes put in place since previous assessment to improve student learning:** This is the first assessment of the CLO. This CLO was developed in Fall 2019. We had developed a matching style quiz using all the steps of the scientific method, but it was not possible for the online courses to use this format. Since we discovered this problem close to the deadline for entering the information into the NOVA Online classes, we quickly developed a new measure that had many construct validity issues. Several questions provided information contrary to the text's explanations.

2. **Impact of changes on current results:** This CLO was tested partially in class and partially online after the COVID shut down of live classes in Spring 2020. As such, the participation rate was poor. Several professors had assessed the CLO, and the results were inaccessible in their offices. Also, the chaotic semester resulted in changes to testing and the syllabi that may have impacted these results.

3. **According to current results, areas needing improvement:** Results are not trustworthy due to poor construct validity, but it appears students need more explicit instruction on the steps involved in the scientific method. We may need to ensure some consistency with regard to how many steps we teach as there is wide variability in the number of steps involved in the process. We also need to provide students with more practice evaluating empirical evidence. This is an introductory class in which the concepts are introduced, but the students might benefit from more practice evaluating evidence. Professors were given the space on the reporting spreadsheet to document their reflections and many commented that they would be spending more time on the research process in future semesters based on their students' responses.

4. **Based on current results, new actions to improve student learning:** The SLO/CLO committee will need to redesign the CLO assessment for future use prior to Spring 2023. Results were presented at the August 2020 Disciple Group meeting and we decided that beginning in Fall 2020, professors will incorporate more information on scientific methodology into their course content

		including: more emphasis in lectures; assignments designed to practice the steps; in-class activities; and a more specific review of materials prior to testing. This information was also shared on the Psychology Disciple Group Canvas site. **5. Next assessment of this CLO:** Spring 2023

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Radiography, A.A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: Program/Discipline Purpose Statement: The curriculum is designed to prepare students to produce diagnostic images of the human body through safe application of x-radiation. The radiographer is a central member of the health care team and assists the radiologist, a physician specialized in body image interpretation. Upon successful completion of degree requirements, the student will be eligible to take the American Registry of Radiologic Technology (ARRT) examination leading to certification as a Registered Technologist in Radiography: A.S., R.T. (R).

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy
Operationalize your CLO here: Determine proper exposure factors to achieve optimum images of anatomical structures.

Assessment Methods

Course Name/Number: Principles of Radiographic Quality I – RAD 141

Direct Measure Used: Quiz 3: Radiation Physics Unit Conversions

CLO/Rubric Criteria or Question Concepts:
- Algebraic Equations
- Exponent Rules
- Dimensional analysis
- Milliamperage rates
- Inverse Square Law
- Scientific notions
- Graph interpretations - X-ray beams
- Histograms

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
ME only	2	2	72
Online	N/A	N/A	N/A
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**2**	**2**	**72**

Assessment Results

Semester/year data collected: Fall 2020
Target: 85% of students will score 80% or higher on Quiz 3 Radiation Physics Unit Conversions
Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Fall 2020	Results Fall 2019
All students assessed	91	93

Results by CLO Criteria: Average/Mean Score per criteria

Results by Question Concepts	Results Fall 2020	Results Fall 2019
1. Algebraic Equations	77	100
2. Exponent Rules	95	100
3. Dimensional analysis	91	85
4. Milliamperage rates	79	75
5. Inverse Square Law	88	50
6. Scientific notions	88	85
7. Graph interpretations - X-ray beams	70	67
8. Histograms	100	75

Target Met: [ ] Yes [ ] No [X] Partially
Current Results improved vs. Previous Results:
[ ] Yes [X] No [ ] Partially [ ] N/A
Narrative comparison of current results to previous results: No significant improvement of scores is noted.
Areas where students met the target: Quiz 3: Radiation Physics Unit Conversions: Exponent rules, dimensional analysis, Inverse square law, scientific notions, and histograms.
Areas where students did NOT meet the target: Quiz 3: Radiation Physics Unit Conversions: Algebraic equations, milliamperage rates, and Graph interpretations- X-ray beams.

Use of Results

1. Changes put in place since previous assessment to improve student learning: This CLO was not assessed for the previous year. In previous years, both the TEAS and Math placement test were required for entrance into the Radiography Program. During the Spring 2020 application process, both the TEAS and Math placement test were not required due to the COVID-19 pandemic and MEC Testing Center being closed to students.

2. Impact of changes on current results: Current results show a drop in the overall average/mean scores for radiation physics unit conversion topics.

3. According to current results, areas needing improvement: Current results state that algebraic equations, milliamperage rates, and graph interpretations for x-ray beam intensity need improvement.

4. Based on current results, new actions to improve student learning: Faculty will review the RAD 141 Principles of Radiographic Quality I curriculum in Spring 2021. The faculty will revisit the TEAS testing and Math requirements in mid-October 2020. Based on current results, the TEAS test and Math requirement are necessary for student success. TEAS and Math requirements will be discussed at the Spring 2021 Faculty meeting.

5. Next assessment of this CLO: Assessment of the CLO will be made again in 2020-2021.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Science: Mathematics Specialization, A.S.

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The curriculum is designed for individuals who plan to transfer to a four-year college or university to complete a baccalaureate degree. This curriculum is designed to prepare students to major in one of the following fields: mathematics, mathematics education, statistics, operations research, applied mathematics, or computer science.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: Interpret mathematical results, state conclusions using statistics and accept or reject the null hypothesis. (current SLO).

Assessment Methods

Course Name/Number: Statistics I - MTH 245

Direct Measure Used: Students were asked to do a statistical analysis of a summary data set provided to them. They were asked terms of *t* and accept or reject the null hypothesis. Students selected from one of five multiple choice answers.

CLO/Rubric Criteria or Question Concepts: Even though the question was multiple choice, instructors were asked to review answers and score as follows: 1 point for correct test statistic (two of the choices had the correct t-value); 1 point for correct conclusion about the null hypothesis.

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	10	0	0
AN	12	4	88
MA	10	9	163
ME	N/A	N/A	N/A
LO	9	4	86
WO	10	5	70
Online	9	0	0
Off-Site Dual Enrollment	N/A	N/A	N/A
Total	**60**	**22**	**407**

Assessment Results

Semester/year data collected: Spring 2020

Target: 70% of students will score at least a 1 (out of 2)

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Spring 2020
All students assessed (on-campus only)	334/407 (82.1%)

Target Met: [X] Yes [ ] No [ ] Partially

Current Results improved vs. Previous Results:
[ ] Yes [ ] No [ ] Partially [X] N/A

Narrative comparison of current results to previous results: This is the first time that Scientific Literacy was measured for any MTH course.

Areas where students met the target: The target was met for this CLO. Data collection did not allow for a disaggregation of results by concept.

Use of Results

1. **Changes put in place since previous assessment to improve student learning:** For the 2019-20 academic year, a new SLO Lead for Math was assigned to SLO data collection and analysis duties. This faculty member left the College in Summer 2020. In general, the Math Discipline Steering Committee decided to incorporate the reporting of a "null" grade to differentiate between students who did not participate in the assessment or skipped the question and students who answered the question incorrectly. To improve data collection from NOL sections, the Math Steering Committee selected a question from a NOL assessment that met this learning outcome to be assessed in all sections, including on-campus sections.

2. **Impact of changes on current results:** The faculty SLO Lead who resigned in Summer 2020 did not transfer collected data to anyone. As a result, data had to be re-collected from all campuses through the Math Discipline Steering Committee. The Alexandria representative was new to these duties in Fall 2020 and was not able to collect the data in time for the writing of this report. Data is collected through the Math Steering Committee and Associate Deans, who contact all instructors assigned to the campus to submit data. Despite the attempts to improve data collection from NOL sections, no data was submitted from these instructors.

3. **According to current results, areas needing improvement:** Data was collected at the end of the Spring 2020 term. However, the SLO Lead left the college and did not submit the collected data to anyone. As a result, the data was re-collected by the Math Steering Committee and resubmitted for analysis reporting purposes in Fall 2020. The AL campus was unable to re-collect any data in time for the report to be completed. SLO Leads are not in place for the 2020-21 academic year, due to budget constraints. However, the analysis of data and completion of this report for the 2020-21 may be challenging without an SLO Lead.

		The instructions for data collection on this particular question were not clear. One campus only reported scores of 0 or 1 (correct or incorrect) and one campus reported scores of 0 or 2 (correct or incorrect). Further, because of the way that data was collected, for those campuses who reported scores of 0, 1 or 2, it is was impossible to tell if the score of 1 was attributed to which concept. Since including data from NOL sections is critical, the Dean will improve communication to the Math Steering Committee and Associate Deans to stress the need to include this data. 4. **Based on current results, new actions to improve student learning:** The rubric for data collection for questions with multiple parts has been improved by the Steering Committee for 2020-21. Faculty will report scores on individual concepts, rather than a singular score for the entire problem. Beginning in 2020, the Steering Committee members are collecting data from each campus, rather than submitting directly to one person. This will improve the retention of collected data. It would be helpful to have one person to manage the collection of data, including reminding Steering Committee members of data collection deadlines and to collect data from dual enrollment sections, NOL sections, and sections taught by adjuncts. The APER is typically sent to Math faculty through the Steering Committee. The report is now posted on the discipline Canvas site and has been shared with the Pathway Council. It will be added as an agenda item for discipline meetings starting in Spring 2021. 5. **Next assessment of this CLO:** Spring 2023 in MTH 154.

Disciplines

Core Competency Assessment Report: Scientific Literacy, 2019-2020

Biology

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Core Learning Outcome: **[ ] Professional Readiness** **[X] Scientific Literacy**

Operationalize your CLO here: Students will understand the scientific method and identify methods of inquiry that lead to scientific knowledge.

Assessment Methods

Course Name/Number: General Biology I/ BIO 101

Direct Measure Used: A quiz consisting of 10 multiple-choice questions that assessed knowledge the scientific method was available on Canvas to all of the BIO 101 students enrolled during the Spring 2020 semester. All BIO 101 sections at NVCC were included in the assessment, including students from all campuses, NovaOnline, and DE. **1313 students** responded.

CLO/Rubric Criteria or Question Concepts:

#1: order of steps
#2: definition of hypothesis
#3: validity of hypotheses
#4: importance of control
#5: definition of data
#6: example of hypothesis
#7: definition of variable
#8: definition of theory
#9: define data collecting
#10: stating a conclusion

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	12	all	148/ 333
AN	32	all	345/ 840
MA	16	all	176/ 358
ME	0	all	0/ 0
LO	18	all	186/ 527
WO	15	all	177/ 414
Online	3	all	80/ 71*
Off-Site Dual Enrollment	22	all	191/ 422
Total	**118**	**all**	**1303**/ 2965**

Assessment Results

Semester/year data collected: Fall 2019

Target:
1. For the whole quiz: 70% of students achieving 70% on the quiz.
2. For each item: 70% of students correctly answering each item.

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Fall '19	Results Spring '19
All students assessed (weighted average)	92.9%	86.2%
On-campus average	92.6%	Not available
Online average	92.8%	Not available
Dual Enrollment average	94.1%	Not available

Results by CLO Criteria:

[X] Average/Mean Score per criteria or
[ ] Percent of Students > target per criteria

Results by Question Concepts	Results Fall '19	Results Spring '19
1. order of steps	95.0%	91.8%
2. definition of hypothesis	95.0%	91.3%
3. validity of hypotheses	95.8%	90.3%
4. importance of control	87.4%	81.3%
5. definition of data	97.0%	95.0%
6. example of hypothesis	86.0%	81.6%
7. definition of variable	94.3%	89.6%
8. definition of theory	91.8%	89.8%
9. define data collecting	91.9%	88.9%
10. stating a conclusion	94.9%	92.3%

Target Met: [X] Yes [ ] No [ ] Partially

Use of Results

1. Changes put in place since previous assessment to improve student learning:

The retirement of Blackboard was an opportunity to change the assessment software and, potentially increase the validity of the assessment. Beginning in 2019-20, each SLO assessment is now administered as a Google Form embedded in Canvas. This platform is less cumbersome for students and more suited to SLO and CLO assessment and item-by-item data analysis.

2. Impact of changes on current results:

In Blackboard, it was cumbersome for students to take a separate quiz for each individual assessment question and only 82% of students who began the assessment finished it. (Unless each question was a separate quiz, it was impossible to do item-by-item analysis.)
Using a Canvas-embedded Google Form for assessment **increased the completion rate from 82% in Blackboard to 100% using Canvas/ Google Forms**.
Inserting the SLO assessments in each BIO course (and some faculty asking students to complete the assessment in class) increased response rates. In 2018-19, 492 students completed the assessment and in 2019-20, 1313 students completed the assessment.
Participation has more than doubled.
In Blackboard, survey questions (degree program, DE and NOL status, etc.) were also problematic it was difficult to analyze responses from NovaOnline and Dual Enrollment students separately.
Using Canvas/ Google Forms, assessment responses can now be analyzed separately for on-campus, NovaOnline, and Dual Enrollment students.

3. According to current results, areas needing improvement:

Biology

*80 students responded “Yes” to the question “Do you take most of your classes through NOVA Online?” when only 71 students were registered for BIO 101 through NovaOnline. The discrepancy is due to error associated with students self-reporting their NOVA Online status. This question has been changed for the SLOs/ CLO given in 2020-2021 to ask “Are you taking BIO 101 as a NOL student?” **1313 students were assessed, but 10 did not specify a campus (and were not NOL or DE students).	**Current Results improved vs. Previous Results:** [X] Yes [ ] No [ ] Partially [ ] N/A **Narrative comparison of current results to previous results:** More students completed the assessment, a higher percentage of students who began the assessment completed it, assessment scores can now be analyzed separately for on-campus, NovaOnline, and dual enrollment students. Student performance on the assessment showed a modest increase, possibly due to a new user-friendly assessment platform (Canvas/ Google Forms) and greater access to the assessment. **Areas where students met the target:** **1. For the whole quiz:** **Target:** 70% of students achieving 70% on the quiz. **Current Results:** 97.3% (1278/ 1313) of students scored 70% or higher. **2. For each item:** **Target:** 70% of students correctly answering each item. **Current Results:** >70% of students answered each question correctly.	Student performance is generally quite good. To improve student learning, faculty could emphasize the concepts of experimental controls (#4) and give students more practice identifying good hypotheses and writing their own hypotheses (#6). **4. Based on current results, new actions to improve student learning:** Discuss the SLO results in the next BIO Discipline Meeting and consider ways to include practice writing hypotheses in 1 or 2 more labs. Faculty will emphasize the concepts of experimental controls (#4) and reinforce the identification of good hypotheses (#6). **5. Next assessment of this CLO:** Fall 2023.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Chemistry

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The curriculum is designed for individuals who are interested in a professional or scientific program and who plan to transfer to a four-year college or university to complete a baccalaureate degree with a major in one of the following fields: agriculture, biology, chemistry, pre-dentistry, forestry, geology, oceanography, pharmacy, physics, physical therapy, pre-medicine, science education, or mathematics.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: Chemistry SLO 1: Students will be able to use quantitative reasoning coupled with scientific knowledge to draw logical conclusions and make well-reasoned decisions.

Assessment Methods

Course Name/Number: General Chemistry I (CHM 111)

Direct Measure Used: Students were provided with prefilled volume of various sized glassware to assess the students' ability to read the volume to the correct number of significant figures with correct unit based on the glassware. The students were then expected to make an informed decision to select the best glassware to perform the density measurement and calculation. The students' ability to evaluate empirical data were assessed by providing a pre-staged density measurement set up and was expected to use scientific process to collect and calculate the density of water.

CLO/Rubric Criteria

#1: Apply Scientific Method.
- Volume of water in various glassware measured correctly.
- Measurements recorded using correct volume, units and significant figures.

#2: Evaluate empirical data:
- Which glassware will provide the most accurate and precise result?

#3: Make informed decisions:
- Select the best glassware for the density of water determination.

Other Method (if used):
Very few sections, who conducted the assessment before March 9th 2020 had access to the laboratory and used actual glassware and lab equipment.

Assessment Results

Semester/year data collected: Spring 2020

Target:
1. Overall average (weighted) and individual modality average is set to 80%
2. Average score for each criterion is set to 80%.
3. 80% of the students to achieve a total score of 80% or more.
4. To increase the number of sections participating in the evaluation to 70% for the results to be meaningful

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results Spring 2020
All students assessed (weighted average)	1.71/2 (85.4%)
On-campus average	1.70/2 (85.2%)
Online average	1.76/2 (88.0%)
Dual Enrollment average	N/A

Results by CLO Criteria:
[X] Average/Mean Score per criteria or
[ ] Percent of Students > target per criteria

Results by SLO Criteria/ Question Concepts	Results Spring 2020
1. Apply Scientific Method	1.57/2 (78.6%)
2. Evaluate empirical data	1.72/2 (86.2%)
3. Make informed decisions	1.83/2 (91.4%)

Use of Results

1. Changes put in place since previous assessment to improve student learning:
This CLO (Scientific Literacy) was assessed for the first time in Spring 2020.

However, changes were put in to address the following suggestion. Only 17 out of 64 CHM 112 sections participated in this evaluation and some campuses did not participate at all during the Spring 2019 assessment. In order to address this, the steering committee took a hands on approach to reaching to the all faculty teaching CHM 111 course. The Chair sent multiple reminders of the assessment, with clear guideline and expectation both full time and adjunct faculty through fellow steering committee and associate deans. The importance of collecting data and sharing the data with the steering committee was emphasized.

With the help of Steering Committee the rubrics were updated by adding clearer expectations about the requirements, including informing the faculty that participation was not optional.
Moreover, for each assessment, an excel template was developed and distributed among faculty to facilitate collecting data.

Via multiple emails and meetings, directions on the process of collecting data was communicated with the faculty. In addition, all faculty were informed about details of the rubrics, by providing directions that included specific instructions for completing the assessments and the due dates for the data to be submitted.

Chemistry

However, due to COVID-19 and college closure, the assessment for majority of the sections were moved to an online platform with realistic, colorful visuals for students to demonstrate their scientific literacy without changing the rubric or spirit of the assessment.

Sample: *N/A*

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	7	3	86
AN	13	12	171
MA	7	6	94
ME	N/A	N/A	N/A
LO	8	5	59
WO	7	7	87
Online	2	2	43
Off-Site Dual Enrollment	0	0	0
Total	**44**	**35**	**540**

Target Met: [X] Yes [ ] No [X] Partially
Current Results improved vs. Previous Results:
[ ] Yes [ ] No [ ] Partially [X] N/A
Narrative comparison of current results to previous results: N/A
Areas where students met the target:

Chemistry courses officially assessed Scientific Literacy for the first time in Spring of 2020. With respect to **target number 1**, overall average met the target and exceeded the expectation by at least 5%. On-campus and On-line averages exceeded the expected target by 5% and 8% respectively. Duel Enrollment classes for CHM 111 was not offered during this semester.

As per **target number 2**, the students were to score an average of 80% in each criterion. General Chemistry students exceeded this target for both criteria 2 and 3 (86.2% & 91.4% respectively). Although both these criteria exceeded the target, the students' ability to make informed decision was slighter better than evaluating empirical data.

During the CLO assessment of Spring 2019, although a different course and criteria were assessed, only 17/64 section offered collected and sent in the data for analysis and only 3/5 campus participated. As a result, one of the target for this year (target number 4) was to include the faculty/section participation to 70% in order to collect meaningful data. This target was met with 35/44 (80%) sections collecting and sending in the data for analysis. This number would have been greater had it not been for college closing due to COVID-19, as some faculty could not access their offices to retrieve their hard copy of their class's data. All campus (both full time and adjunct faculty) also participated in this round of CLO data collection.

Areas where students did NOT meet the target:
Although criteria 2 and 3 exceeded expectation with respect to target number 2 which focuses on the average score of each criterion, criteria 1 fell slightly short of the expected 80% to 78.6%.
In criteria #1, students were expected to apply scientific methods by reading volume of colored water in various glassware and to record the measurements using correct volume, units and significant figures. However, once they

2. Impact of changes on current results:
As a result of this active engagement and guidance of the faculty, many sections were able to provide data. The target of collecting data from at least 70% of the section offered was exceeded to 35 out of 44 of CHM 111 sections (80%). To give credit to the faculty, more data would have been possible if college was not closed halfway due to COVID-19 as some physical data was left inside the building.

3. According to current results, areas needing improvement:
An area of improvement, which is specific to this CLO is the emphasis on criteria 1. Working with students to use laboratory equipment in appropriate way and apply scientific method to collect data correctly.

A few faculty had collected the data incorrectly, despite many reminder and guidance. However, with personal guidance they were able to re-evaluate their students' work and resubmit the data sets. One instructor was not able to resubmit the edited version in time. Hence, area of improvement could be to work more closely with the faculty to give more information about the expectation of the rubric.

4. Based on current results, new actions to improve student learning:
Instructors to emphasize the application of scientific methods to improve performance of criteria 1. Students should be given clear assessment to practice measurements using varying size of graduate cylinders, and rulers with different marking and for students to be able to recognize the number of significant figures each measurement can be reported to, based on the instrument used.
Steering committee will make recommendation to the faculty teaching CHM 111 during discipline meeting at the beginning of semester to emphasize this concept. For students to practice reading measurements from various glassware, with correct significant figures and units.

5. Next assessment of this CLO:
Next CLO will assess either Critical Thinking or Quantitative Literacy. Decision has not been made yet as

collect the data, students seem to be able to evaluate and make informed decisions as demonstrated by results of criteria 2 and 3.

Data table below assists in supporting the analysis of **target number 3**.

Results by SLO Criteria/ Question Concepts	# of student with a score of >80%
1. Apply Scientific Method	264/540 (48.9%)
2. Evaluate empirical data	416/540 (77.0%)
3. Make informed decisions	460/540 (85.2%)
4. Total average of all criteria	393/540 (72.8%)

Note: *For Criteria 1, although the percentage shown is for number of students with a score of >80%, rubric only allows for students with 100% score to be included (2/2) as the next best score possible is 1.5/2 which is 75%. Similarly for criteria 2 and 3, >80% only includes scores of 2/2 and the next best score is 1/2. As for the* ***total average of all criteria*** *(row #4), percentage >80% is a true representation of >80% as these include values such as 1.667/2 and 2/2 and not just 2/2.*

Target number 3 requires 80% of the students to achieve a total score of 80% or more. Data shows 72.8% of the students received the total average of >80%. The main reason for not reaching this target is their performance in criteria 1. The data shows 48.9% of the students successfully gained >80% score for criteria 1. As explained in notes above, this 48.9% of the students reflect the number of students who really achieved 2/2 (100%) score for criteria 1. Working towards increasing the number of students who perform better in criteria 1 will also assist in increasing the total average of all the criteria.

to which one of these will be assessed during the 20-21 cycle.

Next SLO for chemistry is SLO #5, Fall 2020; students will be able to explain the principles of chemical bonding in the formation and properties of molecules.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Economics

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: Economics provides an objective interpretation of human behavior. Rational and predictable economic behavior allows for the quantification and logical analysis of many social problems. Also, an understanding of how the national and international economy functions is critical to success in today's business environment. At the macro-level, how national governments influences the economy and how that affects industry are pertinent to students entering the business world. At the micro-level, explorations of consumer theory, theory of the firm, market structures, and resource markets contribute to students' understanding of the underpinnings of capitalism.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: **SLO 5a (**Students will be able to identify the impact of science and technology on economic outcomes**)**

Assessment Methods

Course Name/Number: Principles of Macroeconomics (Eco 201)

Direct Measure Used: Multiple Choice Questions (**See attached).** Students are given a table of empirical data on production and pricing. They are then asked a series of questions regarding this data. Responding to these questions require students to use scientific knowledge and logic.

CLO/Rubric Criteria or Question Concepts:
1. Calculating Consumer Price Index
2. Calculating Inflation

Other Method (if used):

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	7	6	112
AN	14	4	76
MA	8	8	173
ME	N/A	N/A	N/A
LO	9	4	73
WO	6	5	137
Online	9	9	178
Off-Site Dual Enrollment	0	0	0
Total	**53**	**36**	**749**

Assessment Results

Semester/year data collected: Spring 2020

Target: 75% (75% of student will score more than or equal to 75% on the test)

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Current Results *Spring 2020*	Previous Results *Spring 2020*
All students assessed (weighted average)	**70%**	**69%**
On-campus average	74%	69%
Online average	56%	N/A
Dual Enrollment average	0	N/A

Results by CLO Criteria:
[ ] Average/Mean Score per criteria or
[**X**] Percent of Students > target per criteria

Target Met: [ ] Yes [**X**] No [ ] Partially

Current Results improved vs. Previous Results:
[**X**] Yes [ ] No [ ] Partially [ ] N/A
Narrative comparison of current results to previous results: In terms of the percent of students who scored above the target score, even though the current year results are slightly better than the previous year results, both results fell short of the target scores for their respective years. It is noteworthy that the

Use of Results

1. Changes put in place since previous assessment to improve student learning:
The Steering Committee continues to explore ways to identify the causes for the decline in the performance of students. Some of the measures currently being implemented include, collaborating with VCCS to standardize the course content summaries for the Discipline (the revisions for Principles of Microeconomics and Principles of Macroeconomics are complete and were approved by the Discipline Group in the Fall of 2019. The changes are currently being reviewed by the College's Administrative Council for its approval and adoption.

2. In response to the decision of the Steering Committee to review content and structure of the economics courses offered at NOVA Online, the discipline appointed a Committee in the Fall of 2019 to undertake this exercise. With the help of funding secured by the Discipline Dean, the Committee completed its work in the Fall of 2019 and the revised courses are now being used by NOVA Online. In the Fall of 2019 and later in the Spring of 2020, due to the disruptions caused by the outbreak of COVID-19, I was unable to work with the Steering Committee to set up the Committee to review the declining performance of students in the Discipline as well as the Committee to consider the adoption of a standardized textbook for the Economics Discipline. I intend to hold these discussions with the Steering Committee in AY2020-2021 and possibly get the Committees to complete their work by the end of Spring 2021.

3. According to current results, areas needing improvement:
In the Spring of 2019 the CLO result indicates that performance was way below the target score. Even though the current year results are slightly better than the previous year results, both results fell short of the target scores for their respective years. Disappointingly, it did not even help that Discipline Group lowered the target score used last year from 85% to 75% in the current year. The results for the two

	Discipline Group lowered the target score used last year from 85% to 75%, for the current year's assessment hoping that a greater number of students will achieve the new performance threshold. However, this objective was not achieved for the CLO for AR2019-2020. **Areas where students met the target:** The data collected does not provide a basis for determining the areas where students met the target. **Areas where students did NOT meet the target:** The data collected does not provide a basis for determining the areas where students did not meet the target.	reporting periods may not be enough to be considered a pattern, but it is nevertheless important that the Discipline Group begins to consider measures to arrest the situation before it declines any further. One of the areas that needs improvement is for instructors in the Economics Discipline to thoroughly familiarize themselves with the specific requirements of CLOs prior to selecting questions for use in testing those CLOs. There seems to be a certain level of disconnect between the prepackaged, publisher-provided Multiple Choice questions used by the Discipline and the proficiency requirements of the CLO tested. In the Fall of 2020, I intend to bring up this issue to the attention of Steering Committee members for their consideration and implementation when it is their turn to set questions for the assessment. Another area that needs improvement is the type of questions used to test CLOs. Currently, the Discipline uses Multiple Choice questions to test CLOs. It is my observation that CLOs often require a proficiency in several concepts, which can better be satisfied with essay questions that are carefully constructed to suit the specific requirements of the CLO or to test the mastery of those concepts required in the CLO. I am therefore planning to propose the use of short essay questions instead. I intend to make this proposal to the Steering Committee for its consideration in the Fall of 2020 or the Spring of 2021. The results also suggest that students need an improvement in their Scientific Literacy skill set. However, considering the low rate of participation by faculty and students, care must be exercised in the interpretation of the results and using them as a basis for any meaningful recommendations. **4. Based on current results, new actions to improve student learning:** Hopefully, there is some abatement in the disruptions caused by the outbreak of COVID-19 and the Discipline will implement the measures adopted in the last reporting cycle in Fall 2020 and Spring 2021. In the Fall of 2020, I will work with the Steering Committee to set up a Committee to review the declining performance of students in the Discipline as well as the Committee to consider the adoption of a standardized textbook for the Economics Discipline across campuses. I intend to hold these discussions with the Steering Committee in AY2020-2021 and possibly get the Committees to complete work on these measures by the end of Spring 2021. The discipline will also explore the possibility of inviting the General Education Coordinator from the Office of Academic Assessments to organize a Zoom workshop for the members of the Econ Steering Committee to help with ways to compose economics questions that better align with or satisfy the requirements of CLOs. **5. Next assessment of this CLO:** Spring 2021

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Geography

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Discipline Purpose Statement: The mission of the geography discipline is to provide a world-class geographic education through face-to-face, online, and hybrid courses, and prepare students for graduation, transfer, and entrance into employment.

Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy
Operationalize your CLO here: Students will determine which technology to use to best accomplish workplace tasks and solve workplace problems. They will display proficiency with ubiquitous technology applications and use technologies successfully to communicate new information.

Assessment Methods

Course Name/Number: GEO 210 Intro to Cultural Geography
Direct Measure Used: Assignment in two parts: Reading the Cultural Landscape and Making Sense of Census Data.
This assignment requires students to:
1. use a digital camera to take pictures of a cultural landscape,
2. to research the same place by accessing census data through the Census.gov website,
3. and to use the ArcGIS StoryMap application to create a narrated map of the location.

Provide Rubric Criteria or Question Concepts: (attach Rubric): See attached rubric.
The rubric scored student use of technology based on:
1. Use technologies to conduct research
2. Use technologies to organize data
3. Evaluation of data
4. Use technologies to create/present new information

Sample: *(Specify N/A where not offered)*

Campus/ Modality	# Sections Offered	# Sections Assessed	# Students Assessed
AL	1	1	9
AN	1	0	0
MA	4	0	0
ME	0	0	0
LO	2	0	0
WO	0	0	0
Online	3	0	0
DE*			
Total	11	1	9

Assessment Results

Semester/year data collected: Spring 2020
Target: 75/100
Results: 84/100
Overall Average/Mean Score by Modality.

Results by Modality	Results [SP 2020]
In-class	84
Online	N/A
Total Average	**84**

SLO Criteria: (Check type of score)
[X] Average/Mean Score per criteria or

Results by SLO Criteria/	[SP 2020]
1. Research	87
2. Organize	87
3. Evaluate	87
4. Present/create	82
Total Average	**86**

Target Met?
[X] Yes [ ] No [ ] Partially
Current Results improved vs. Previous Results?
[ ] Yes [ ] No [ ] Partially [X] N/A
Narrative comparison of current results by criterion/concept to previous year's results: This was the first attempt to assess professional readiness in GEO 210.

Strengths: Classroom lecture prepared students with background information on fieldwork, the Census, cultural landscape concepts, and to introduce the ArcGIS StoryMap tool. Students were able to ask questions and trouble shoot in the classroom while they worked with the various tools.
Weaknesses: This is a complex and multi-part assignment. Will need to closely coordinate with GEO instructors to implement and assess in the future.

Use of Results

1. Changes put in place since previous CLO assessment to improve student learning: This was the first attempt to assess professional readiness and one classroom was involved in assessment. The assignment introduced students to multiple new technologies and concepts. This was a small class where individual attention and feedback was possible.

2. Impact of changes on current results: Not applicable; first attempt.

3. According to current results, areas needing improvement: If this assignment were to be adapted and used in courses across other campuses, other instructors would need to be prepped in advance, so that they are comfortable using and answering questions about the Census website and the StoryMap application.

4. Based on the results, current actions to improve CLO: SLO lead is adding the assignment instructions and links to the shared GEO Canvas course where other instructors may access the materials. GEO could improve results with a greater sample size. There are two full-time GEO faculty. The semester was interrupted by COVID and medical leave by the SLO lead, so faculty did not have time to collaborate to design a complete plan. The SLO lead instead used existing course and assignment for assessment. Assignment will be shared by SLO lead on GEO Canvas shell with all GEO instructors. Suggestions for adapting or improving the assignment and assessment will be requested. Results will be posted by SLO lead on GEO Canvas shell so that all GEO faculty can use results to improve their teaching of the assessed skills.
5. Next assessment of this CLO: 2022-2023

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Geology

NOVA Mission Statement: With commitment to the values of access, opportunity, student success, and excellence, the mission of Northern Virginia Community College is to deliver world-class in-person and online post-secondary teaching, learning, and workforce development to ensure our region and the Commonwealth of Virginia have an educated population and globally competitive workforce.

Program/Discipline Purpose Statement: The purpose of the geology discipline is to teach students how Earth works as a system and how humans interact with Earth. Geology looks at some of the most important issues in society today including energy sources and sustainability, climate change, the impacts of developments on the environment, water management, mineral resources and natural hazards.

Core Learning Outcome: **[ ] Professional Readiness** **[X] Scientific Literacy**

Operationalize your CLO here: Describe the basic parts of the process of evolution

Assessment Methods

Course Name/Number: Historical Geology GOL 106

Direct Measure Used: Lab and exam questions. Students were asked a series of questions to identify the foundational principles of evolution and to cite examples to support these.

CLO/Rubric Criteria or Question Concepts: Describe the basic parts of the process of evolution.

Other Method (if used): N/A

Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL on campus			
AL synchronous	1	1	21
AN on campus			
AN synchronous	4*	3	62
MA on campus			
MAsynchronous	2	2	41
ME on campus			
ME synchronous			
LO on campus			
LO synchronous	4	3	67
WO on campus			
WO synchronous	1	0	0
Online (asynchronous)	3	0	0
Off-Site Dual Enrollment	0	0	0
Total	15	9	193

Assessment Results

Semester/year data collected: Spring 2020
Target: 70% of students pass with >70% score
Results: An accumulation of 70% of possible points was considered successful for non-science majors and 90% for science majors.
Non-science majors scored above their 70% successful completion target with a 81% success rate. Science majors fell just short of the 90% target with a 82% success rate.

Results by Modality	Current Results *Semester Year*	Previous Results *Semester Year*
All students assessed (weighted average)		
hybrid/ synchronous	81%	84%
Online average		
Dual Enrollment average		

Results by CLO Criteria:
[ ] Average/Mean Score per criteria or
[ ] Percent of Students > target per criteria

Target Met: [X] Yes [ ] No [X] Partially

Current Results improved vs. Previous Results:
[ ] Yes [X] No [ ] Partially [ ] N/A

Narrative comparison of current results to previous results: There was s slight decrease in student performance among non-majors, and a larger decrease among Science majors (89%-82%)

Use of Results

1. Changes put in place since previous assessment to improve student learning:

2. Impact of changes on current results: There has been a small decline in student scores on this assessment. The switching to online learning occurred at the time this was being taught which may have impacted the students' learning

3. According to current results, areas needing improvement: While overall students are meeting the target percentage, there can be improvement in communicating to students the relationships of the basic principles to the overall theory.

4. Based on current results, new actions to improve student learning: The discipline members will discuss possible reasons and remedies at the next discipline meeting.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Physics

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Program/Discipline Purpose Statement: The curriculum is designed for individuals who are interested in a professional or scientific program and who plan to transfer to a four-year college or university to complete a baccalaureate degree with a major in one of the following fields: agriculture, biology, chemistry, pre-dentistry, forestry, geology, oceanography, pharmacy, physics, physical therapy, pre-medicine, science education, or mathematics.

Core Learning Outcome: [ ] Professional Readiness [x] Scientific Literacy

Operationalize your CLO here: Students will recognize and know how to use the scientific method, and to evaluate empirical information.

Assessment Methods

Course Name/Number: General College Physics I, PHY 201 and General College Physics II, PHY 202

Direct Measure Used:
All instructors selected one laboratory experiment for which students were required to organize their measurements in a table, plot a graph with the acquired data, calculate a slope using linear regression, and interpret the meaning of the slope. The laboratory experiment could be administered as group work, but each student had to perform and complete the data analysis independently.
Instructors had to introduce an uncertainty calculation in their activity to gauge if the results were reasonable. For example, they had to ask students to find a percent error between their slope and the physical parameter represented by that slope. Instructors had to include one question on identifying possible source of errors or experiment improvement.

CLO/Rubric Criteria or Question Concepts:
The CLO assessment was part of a SLO. Two criteria were interconnected. According to the rubric score, in particular the third and the four criteria were dedicated to recognizing the scientific method and to evaluating empirical data.
Criterion 3 also connected to the CLO SL) The third component is to determine the slope of graph. Are students able to correctly read and interpret scientific results? This is one aspect of scientific literacy: to understand scientific information. Students must use linear regression (and not delta y /delta x). Depending on the experiment, students should be able to obtain from the slope the correct value (sometimes for example, students do not work in the consistent units and their slope is off by factors of 10.) Alternatively, the students

Assessment Results

Semester/year data collected: Spring 2020

Target: 70% of the students should reach a score of (2/2) on each criterion. The score of "2"is the highest ranked score for each criterion. Students with a score of 2 showed to be proficient with data analysis and data interpretation.
The students average misses our target by a 2%.
Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Current Results *Semester Year*	Previous Results *Semester Year*
All students assessed (weighted average)	**68%**	**N/A**
On-campus average	55%	N/A
Online average	71%	N/A
Dual Enrollment average	80%	N/A

Results by CLO Criteria: On the table below, it is reported the percentage of students who scored a maximum 2/2 on each criterion.

[ ] Average/Mean Score per criteria or
[X] Percent of Students > target per criteria

Results by SLO Criteria/ Question Concepts	Current Results Semester Year	Previous Results Semester Year
1. Interpret the plot	71%	N/A
2. Measure of error	59%	N/A

Target Met: [ ] Yes [ ] No [X] Partially

Current Results improved vs. Previous Results: N/A

Use of Results

1. Changes put in place since previous assessment to improve student learning: N/A

2. Impact of changes on current results:
This semester was the first semester where the assessment was tested on a reasonable number of students in order to obtain useful statistic information. Per Physics Review 2014, one of the discipline goals is to teach students how to organize, analyze data, and to learn how to interpret data. This CLO was targeting this goal.

3. According to current results, areas needing improvement: Increase activities where students learn how to plot data using spreadsheets. According to one of the goals of the physics discipline, instructors need to teach students how to organize and analyze data using spreadsheets.
Increase students awareness of error calculations and source of errors when collecting data and consequently interpreting a chart.
The lab activity for the online classes were devised with several simple, straightforward steps that students easily could follow; therefore, leaving little room for pitfalls or individual creativity. All online courses participated in the assessment, but data from one class was not included because it was not significant. All the students obtained 2/2 on two criteria and they were not tested on the other two criteria.

4. Based on current results, new actions to improve student learning:
The current report will be shared with all physics faculty (full time and adjunct) and in particular the points discussed above will be stressed. Faculty will be asked to make sure to underline with students the importance of

should be able to manipulate the slope to extract a result for the physical quantity.
Criterion 4 also connected to the CLO SL) The fourth component should test whether the students properly relate the slope to the physical situation and physical quantity. If the students understand the accuracy of their results. Students need to calculate an error and explain sources of possible error.
Other Method (if used):N/A
Sample:

Campus/ Modality	Total # of Sections Offered	# Sections Assessed	# Students Assessed
AL	3	2	49
AN	3	2	44
MA	3	2	17
ME	N/A	N/A	N/A
LO	3	3	51
WO	3	3	40
Online	3	2	36
Off-Site Dual Enrollment	13	6	136
Total	**31**	**20**	**373**

[ ] Yes [ ] No [ ] Partially [X] N/A

Narrative comparison of current results to previous results: N/A

Areas where students met the target: Students have a grasp on how to find the slope of the line on a chart and how to relate it to a physical quantity.
They have a good understanding on how to evaluate the empirical information.

Areas where students did NOT meet the target:
Students need to improve their understanding that each measurement is affected by an error, they need to learn that “human error” is not a meaningful source of uncertainty.

learning to interpret a graph and recognize the information presented via the charts.

The spring 2020 semester was a unique time when instruction was moved remotely .It will be interesting to compare the results with a semester where the learning platform is in person with no global disasters. We are confident that results will show better patterns on semesters where students will be more stress-free.

5. Next assessment of this CLO: Most likely Fall 2023.

Core Competency Assessment Report: Scientific Literacy, 2019-2020
Sociology

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Core Learning Outcome: [ ] Professional Readiness [X] Scientific Literacy

Operationalize your CLO here: Students will identify the main methods of data collection and analysis in sociology.

Assessment Methods

Course Name/Number: Principles of Sociology/ SOC 200

Direct Measure Used: 10 Multiple Choice Questions

CLO/Rubric Criteria or Question Concepts:

1. Scientific research method
2. Research orientation (Interpretive)
3. Objectivity in Research
4. Sampling in Research
5. Research Validity
6. Quantitative Analysis
7. Data analysis methods (secondary data analysis)
8. Research data collection methods (surveys)
9. Research data collection methods (field research)
10. Research Ethics

Sample:

Campus/ Modality	# Section Offered	# Sections Assessed	# Students Assessed
AL	8	7	133
AN	15	6	100
MA	5	4	98
ME	n/a	n/a	n/a
LO	7	7	102
WO	6	4	100
Online	5	5	65
Off-Site Dual Enrollment		0	0
Total	**46**	**33**	**616**

Average response rate across all modalities= 70%

Average response rate on campus = 73%

Assessment Results

Semester/year data collected: Spring 2020

Target: 70%

Results: Overall Average/Mean Score by On-Campus, Online, and Dual Enrollment:

Results by Modality	Results *Spring 2020*
All students assessed (weighted average)	85.4
On-campus average	85.7
Online average	84.4

Results by CLO Criteria:

[X] Average/Mean Score per criteria or

[ ] Percent of Students > target per criteria

Results by Question	Results Spring 2020
3.	80
4.	86
5.	59
6.	87
7.	86
8.	91
9.	91
10.	95
11.	91
12.	88

Target Met: [X] Yes [ ] No [ ] Partially

Current Results improved vs. Previous Results:

[X] Yes [ ] No [ ] Partially [ ] N/A

Narrative comparison of current results to previous results:

Use of Results

1*. Changes put in place since previous assessment to improve student learning:*

-The Chair created a discipline wide announcement to explain our CLO assessment. This announcement was distributed to all faculty members.
-The Chair created step by step instructions to guide faculty members through the assessment process.
-The discipline created a specific quiz for this assessment
-The number of questions was reduced from 12 in the previous assessment to 10 questions on this assessment.
-Adjunct and fulltime faculty were included in the assessment design
-The discipline implemented a standardized method of assessment across the college and all modalities (10 question quiz administered through Canvas)
-To ensure the standardized method of assessment, the Chair worked with IT to have the quiz imported into each faculty members Canvas site
- To maintain standardization of the collected data, a spreadsheet template for collecting information was developed and distributed to all faculty.
- An excel spreadsheet template was created to break down data into more specific categories for analysis
-Data sets were broken down by modality, class session, campus, adjunct/full-time instructor
-Online sections were included in this year's assessment

****The sociology steering committee met with the General Education Assessment coordinator and there was confusion about the number of assessments for 2019-2020. Thus, a separate SLO assessment was not administered.**

2. *Impact of changes on current results:*

-Comparison of modalities was able to be conducted
-comparison of results between adjunct and full-time instruction was able to be conducted
-standardizing the method of assessment increased the reliability of the results

2a. Impact of COVID

-low student response rates in online classes
-low adjunct faculty participation rates
-low number of sections assessed (specifically at Annandale)

Sociology

Average response rate online= 52%	-All campuses (including online sections) were included in this year's results. -All campuses (including online sections) met and even exceeded the targeted value. -The overall scores on the assessment exceeded the target. -The average score increased from 83% to 85%. (note: examined a different CLO, so direct comparison is not possible) - Based on results, there were more sections overall that produced test results compared to last year (this year all 5 campuses and online were included). -Despite the setbacks associated with Covid, we slightly increased our sample size from the previous year. *This year the overall number of students assessed (sample size) should have increased more significantly since last year only 4 campuses participated and online was not included but only 40% of Annandale's sections were assessed. **Areas where students met the target:** All areas except #3 were met 1. Scientific research method 2. Research orientation (Interpretive) 4. Sampling in Research 5. Research Validity 6. Quantitative Analysis 7. Data analysis methods (secondary data) 8. Research data collection methods (surveys) 9. Research data collection methods (field research) 10. Research Ethics **Areas where students did NOT meet the target:** There was only one area where students did not meet the target – Question # 3 (objectivity in research). This may improve by the addition of a research related activity to the curriculum during the first few weeks of school.	-*This year the number of sections assessed overall should have increased more significantly since last year only 4 campuses participated and online was not included. ***3. According to current results, areas needing improvement:*** -increase adjunct faculty participation -increase overall student response rates -increase student response rates for online classes -Increase sample size (number of sections assessed) -Scientific Research methods and more specifically, objectivity in research were the lowest scoring topics. This points to a need for clarification and/or expansion of this section in class. **4. Based on current results, new actions to improve student learning:** During the 2020-2021 academic year the Chair/steering committee will : -Increase sample size (number of sections assessed). (Post-Covid rates should show an increase) -increase the number of questions assessing the lowest scoring topics (Scientific Research methods and Objectivity in research). Including more than one question will allow us to better determine if the problem is the clarity of the question or student weakness in those particular areas. It will also give more insight into how students are performing in those areas. - will create a new class assignment that will be distributed to all faculty, which focuses on the areas of Sociological research. This is to ensure that all students have access to the same information and are better able to understand sociological research. The Chair will work with IT to have the quiz imported into each faculty members Canvas site or uploaded to the Canvas Sociology Discipline site. - Continue prior action: The Chair will create a step by step guide for the assessment process (administration and collection of the results), which will be distributed to all faculty. -Chair will create a discipline wide explanation of the importance of CLOS, which will be distributed to all faculty (adjunct and fulltime) - A discipline wide reminder of the assessment deadline will be created by the steering committee. - CLO/SLO lead will send more frequent reminders to faculty about the assessment requirements and deadlines. After data collection and analysis, the CLO/SLO lead will review the results will all faculty. **5. Next assessment of this CLO:** - Scientific Literacy will be assessed again in 2023

PATHWAY TO THE AMERICAN DREAM

NOVA's Strategic Plan 2017-2023

THE NOVA COMMITMENT

As its primary contributions to meeting the needs of the Commonwealth of Virginia, the Northern Virginia Community College pledges to advance the social and economic mobility of its students while producing an educated citizenry for the 21st Century.

THE STRATEGIC PLAN GOALS AND OBJECTIVES

To deliver on this commitment NOVA will focus its creativity and talent, its effort and energy, and its resources and persistence, on achieving three overarching goals—success, achievement, and prosperity. It will strive to enable **Every Student to Succeed, Every Program to Achieve,** and **Every Community to Prosper.**

To advance the completion agenda described above, thereby promoting students' success and enhancing their social mobility, ensuring that programs achieve, and producing an educated citizenry for the 21st Century, the following goals and objectives are adopted:

GOAL 1: Every Student Succeeds

- **Objective 1:** Develop a College-wide approach to advising that ensures all students are advised and have access to support throughout their time at NOVA
- **Objective 2:** Implement VIP-PASS System as the foundational technology based on NOVA Informed Pathways for student self-advising, assignment and coordination of advisors, and course registration

GOAL 2: Every Program Achieves

- **Objective 3:** Develop comprehensive, fully integrated Informed Pathways for every program to ensure seamless transitions from high school and other entry points to NOVA, and from NOVA to four-year transfer institutions or the workforce
- **Objective 4:** Develop effective processes and protocols for programmatic College-wide collective decisions that include consistent, accountable leadership and oversight of each academic program with designated "owners," active advisory committees, clear student learning outcomes and assessments, and program reviews in all modalities of instruction
- **Objective 5:** Align NOVA's organizational structures, position descriptions, and expectations for accountability with its overarching mission to support student engagement, learning, success and institutional effectiveness

GOAL 3: Every Community Prospers

- **Objective 6:** Enhance the prosperity of every community in Northern Virginia by refocusing and prioritizing NOVA's workforce development efforts
- **Objective 7:** Further develop NOVA's IT and Cybersecurity programs to support regional job demand and position NOVA as the leading IT community college in the nation
- **Objective 8:** Re-envision workforce strategies and integrate workforce development into a NOVA core focus
- **Objective 9:** Plan to expand the breadth and reach of NOVA's healthcare and biotechnology programs, and prioritize future programs to support regional economic development goals

NOVA

Northern Virginia
Community College

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