Institutional Effectiveness Audit of Critical Thinking: 2017-2018

NORTHERN VIRGINIA COMMUNITY COLLEGE

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.

Table of Contents

List of Tables

List of Figures

Appendix

Institutional Effectiveness Audit of Critical Thinking: 2017-2018

Executive Summary

This section summarizes key findings from the Office of Academic Assessment's 2017-2018 *Institutional Effectiveness Audit of Critical Thinking.* The audit considers the assessment data gathered from all programs and disciplines performing critical thinking assessments. This data is used to summarize the college-wide assessment process and the evidence of student learning in the area of critical thinking.

1. Submission and Quality of Critical Thinking Assessments.
   - 36 educational programs and standalone certificates and 7 disciplines without degrees submitted critical thinking assessments in 2017-2018.
   - Based on the rubric used by the Office of Academic Assessment, the overall quality of 2017-2018 critical thinking assessment reports written by programs and disciplines was excellent. At 93 percent, the average score of programs and disciplines reached the meeting expectations scoring range (90-100 percent).
2. Course Embedded Critical Thinking Assessments.
   - Approximately 83 percent of educational programs and disciplines used existing student learning outcomes to operationalize critical thinking.
   - 4,603 NOVA students, across modalities, took part in the assessment process.
3. Measurement of Student Achievement in Critical Thinking.
   - 93 percent of programs' and disciplines' assessments clearly align with the VCCS definition of critical thinking.
   - Approximately 50 percent of questions or items on a rubric used to operationalize critical thinking were forms of analysis (used 41 times by programs and disciplines) and forms of explanation or identification of an issue (used 30 times by programs and disciplines).
4. Actions to Improve Student Learning.
   - Disciplines and programs took 267 actions to improve critical thinking assessment and student learning.
   - 55 percent of the actions by programs were in the area of curricular changes.
   - 71 percent of the actions taken by disciplines focused on assessment improvements.
5. Critical Thinking Working Group Highlights.
   - Thirty-six deans, provosts, and faculty members, from the six NOVA campuses attended the 2017-2018 Critical Thinking Working Group Zoom meeting.
   - Attendees indicated strong interest in a series of follow-up meetings concerning critical thinking at NOVA.
   - Representative comments from the discussion.
     - Include core learning outcome infographics on relevant Canvas course sites.
     - Post critical thinking related assessment exam questions or prompts, rubrics, and sample innovative assignments on Canvas.

- Programs/disciplines might consider creating a long-term (five years or so) assessment schedule.

Institutional Effectiveness Audit of Critical Thinking: 2017-2018

Introduction

The State Council for Higher Education in Virginia (SCHEV) and the Virginia Community College System (VCCS) define general education as a core set of knowledge, abilities, and skills essential to the undergraduate curriculum to optimize student success for work and life. There are six general education content areas prescribed by the Virginia Community College System (VCCS) for all system college curricula are: Civic Engagement, Critical Thinking, Professional Readiness, Quantitative Literacy, Scientific Literacy, and Written Communication. At NOVA, these crucial skills and knowledge are called core learning outcomes (CLOs). Core learning outcomes are developed in general education courses and practiced and homed in individual fields of study. The teaching and assessment of these skills and knowledge are dispersed across the curriculum. Educational degree programs, select certificates, and disciplines without degrees at NOVA assess general education core learning competencies.

This report examines NOVA students' achievement in the critical thinking general education core competency during 2017-2018. *VCCS' General Education (5.0.2)* policy defines critical thinking (CT) as "the ability to use information, ideas and arguments from relevant perspectives to make sense of complex issues and solve problems." Critical thinking is an essential competency for success and effectiveness in the professional and personal arenas. By improving proficiency in this core learning outcome (CLO), individuals can apply critical thinking skills to solve conflicts, differentiate between biased news and reliable information, or make logical decisions in everyday life. To this end, NOVA assesses the extent to which students learn to think critically during their studies.

This CLO assessment is part of a larger three-year cycle assessing NOVA's six core learning outcomes. The overarching goal of this process is determining students' level of mastery of the general education competencies (Table 1). Each year, the College's programs and disciplines assess at least one of two scheduled CLOs for college-wide reporting. NOVA initiated the three-year assessment cycle in 2017-2018. The first assessments were of critical thinking and quantitative literacy.

Table 1: Core Learning Outcome Assessment Schedule 2017-2018 to 2022-2023

Core Learning Outcome	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Civic Engagement		X			X	
Critical Thinking	X			X		
Professional Readiness			X			X
Quantitative Literacy	X			X		
Scientific Literacy			X			X
Written Communication		X			X	

Prior to 2017-2018, Virginia Community College System (VCCS) required NOVA to assess general education core competencies using standardized assessment measures chosen by the VCCS. NOVA implemented course embedded assessment, a direct measure using students' actual coursework, in 2017-2018. This decision was based on recommendations from NOVA's

Ad Hoc Committee on General Education Assessment, established in 2016, and the State Council of Higher Education for Virginia (SCHEV) *Policy on Student Learning Assessment and Quality in Undergraduate Education* adopted in July 2017.

All educational programs, standalone certificates, and disciplines report on the assessment of each CLO in four broad areas: how the learning outcome is assessed; the assessment method; the assessment results; and how the results will be used to continuously improve student learning (Table 2).

Table 2: Reporting Areas for Annual Core Learning Outcome Reports

CLO	Assessment Methods	Assessment Results	Use of Results
What was assessed?	*What methods were used? Who was assessed?*	*When did the assessments take place? What were the results? Have results improved over time? What areas need improvement?*	*What actions have been implemented to improve student learning? What actions will be taken in the future to improve student learning based on the results of the assessments?*

This *Institutional Effectiveness Audit of Critical Thinking: 2017-2018* describes and analyzes the assessment reports provided to the Office of Academic Assessment by NOVA's educational programs, select certificates, and disciplines without degrees. It is divided into six sections:

- Section I discusses educational programs' and disciplines' participation in the 2017-2018 critical thinking assessment and the quality of assessment reporting;
- Section II reviews programs' and disciplines' operationalized definitions of critical thinking and an analyzes of sample sizes;
- Section III describes the extent to which programs and disciplines met their target goals
- Section IV highlights the changes made by programs and disciplines to improve assessment and student learning;
- Section V focuses on changes recommended to improve the next assessment of critical thinking. These recommendations were made by the Office of Academic Assessment and the Critical Thinking Working Group, comprised of full-time and part-time faculty and NOVA administrators;
- Section VI concludes the report.

<u>**Section I: Submission and Quality of Critical Thinking Assessments**</u>

A. Submission of Reports

In 2017-2018, 36 programs and seven disciplines assessed critical thinking (Figure 1).[1] Participation was not limited to the programs and disciplines involved in the General Education curriculum at NOVA; all programs and disciplines, including academic pathway programs leading to matriculation at a four-year institution, trade programs/disciplines, and the Medical Education Campus participated in the assessment of critical thinking. These reports have been compiled into the *Critical Thinking Core Learning Competency Assessment Report: 2017-2018* report, which can be found on the Office of Academic Assessment's webpage.

As mentioned above, critical thinking and quantitative literacy were the CLOs assessed in 2017-2018. Figure 1 below illustrates the number of programs and disciplines assessing these two CLOs. (Note that one program and two disciplines conducted CLO assessments for other competencies.) For more information about the Quantitative Literacy assessment, see the *Quantitative Literacy Core Learning Competency Assessment Report: 2017-2018*.

Figure 1. Submission of Core Learning Outcomes Assessment: 2017-2018
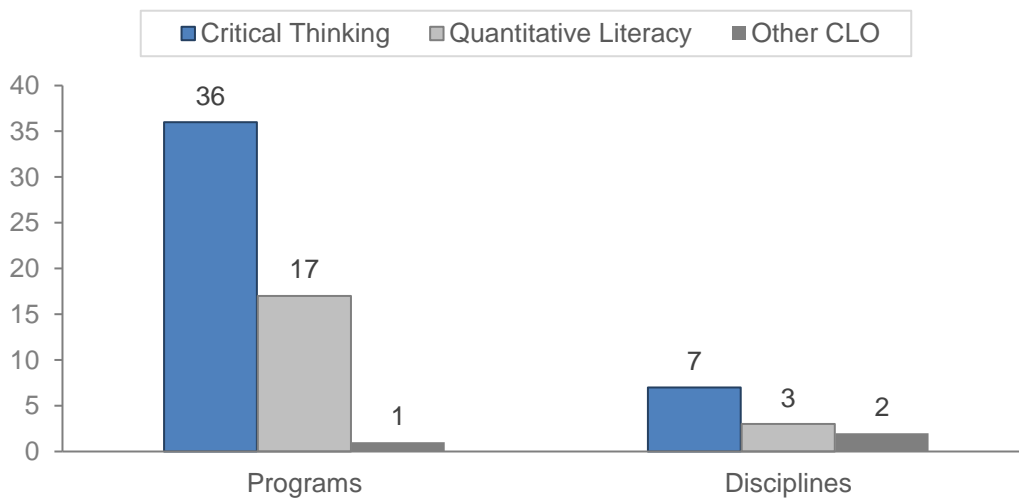
B. Quality of Assessment Reporting by Programs and Disciplines

The Office of Academic Assessment evaluated the quality of 43 educational programs' and disciplines' APERs using a rubric to score each section of the reports: (1) the operationalization of the core learning outcome, (2) the assessment method used, (3) the assessment results, and (4) how the results are used to improve student learning and/or the assessment process. The rubric awards points for the quality of reporting in each of these four sections of the APER. The Office breaks down each section of the APER into several sub-sections creating detailed suggestions for the program or discipline receiving the report. Points are awarded for addressing the variety of components of the APER: two points for meeting the requirement, one point for partially meeting it, and zero points for not meeting the requirement. Using the resulting

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[1] 66 programs and disciplines submitted reports assessing critical thinking, quantitative literacy, or another CLO. As three of the multi-disciplinary transfer degrees submitted aggregated data by discipline, which could not be disaggregated, these assessments are only counted once. Information Technology and Information Systems Technology submitted the same aggregated data for both IT and IST students, and is therefore only counted once.

scores, reports are classified by performance: meeting expectations, mostly meeting expectations, partially meeting expectations, and not meeting expectations (Table 3).

Table 3. Quality of Reporting in the *APER*: Rubric Scale

Score on Rubric	Color	Performance Level
90%-100%	Dark Green	Meeting expectations
80-89%	Light Green	Mostly meeting expectations
70%-79%	Yellow	Partially meeting expectations
Below 70%	Red	Not meeting expectations

The rubric scores for the 2017-2018 critical thinking APERs are provided in Table 4. Programs' and disciplines' *Critical Thinking Annual Program Evaluation Reports* scored in the top two performance levels awarded on the rubric, meeting expectations and mostly meeting expectations. These numbers indicate a high level of success in this first year of CLO assessment at NOVA as well as a commitment to useful data collection, analysis, and subsequently, improving the assessment culture.

Table 4. Quality of Critical Thinking Reports/ Rubric Results: 2017-2018

	Educational Programs	Disciplines Without Degrees	Programs and Disciplines
CLO Criteria	98.5%	91.0%	97.4%
Evaluation Methods	95.6%	81.4%	93.5%
Results	93.1%	91.4%	92.9%
Use of Results	88.7%	81.0%	87.6%
TOTAL	**94.0%**	**84.5%**	**92.6%**

While programs have formally assessed student learning since the 2008-2009 academic year, disciplines submitted a formal assessment report for the first time in 2017-2018. After disaggregating the scores by programs and disciplines, the benefit of practice becomes clear. Program scores exceed discipline scores by almost ten percent. It is expected that discipline rubric scores will improvement in the next few years as disciplines fine-tune their assessment methods, become more familiar with the assessment process and report writing, and develop a stronger culture of assessment.

Section II: Course Embedded Assessments

Examining core learning outcomes using course embedded assessment relies on educational programs' and disciplines' ability to align the VCCS definitions of the core learning outcomes with an appropriate course assignment and subsequently, operationalizing the CLO. Some programs use existing program SLOs to assess the core learning outcome in question (Figure 2). Faculty consult their program's curriculum map, which indicates: the student learning outcome being taught and assessed in each core course; the method of assessing the SLO, (exam, paper, etc.); and the level of proficiency provided by the course (introduced, practiced, and mastered). After determining which course most closely aligns with the CLO being assessed, faculty operationalize the CLO so it best reflects the skills or abilities expected in the selected course(s).

An effective CLO assessment cycle includes: operationalizing the CLO; establishing an appropriate sample size across courses and modalities (i.e., on campus, online, hybrid, or off-site dual enrollment); determining the assessment method; distributing the assessment to faculty teaching the selected course sections; gathering and analyzing data; making decisions about actions to take to improve student learning and the assessment process based on the assessment results; writing the report; and disseminating this information to the program/discipline faculty (Figure 2). To implement this cycle of assessment, Discipline Chairs and SLO Leads rely on their full-time and part-time faculty, provosts, deans, and other administrators.

Figure 2. The Assessment Process Cycle
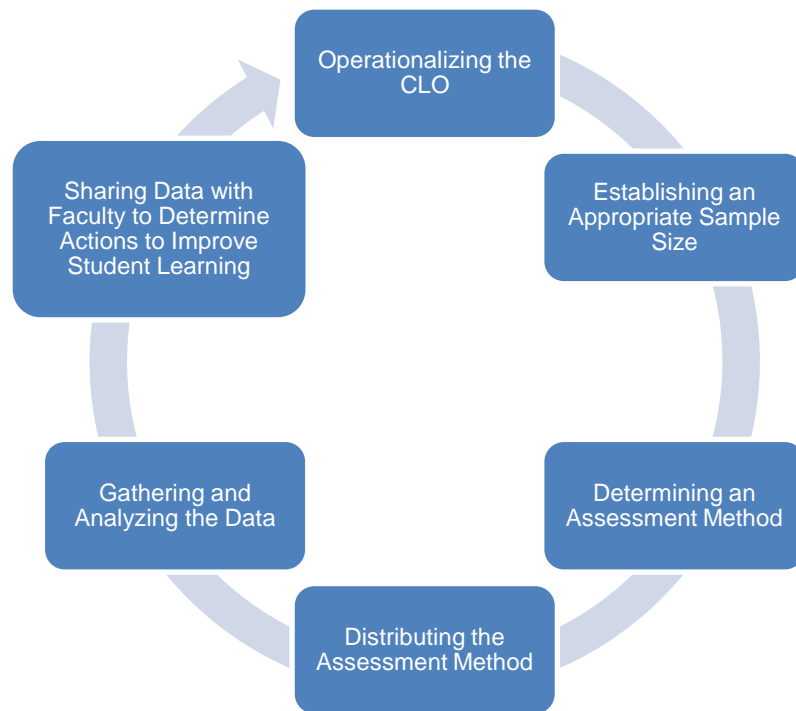
A. Operationalizing Critical Thinking

Programs and disciplines begin with the VCCS definition of critical thinking then operationalize it to reflect the skills and competencies taught in their courses. Programs and disciplines may consult the Office of Academic Assessment to ensure that the operational outcomes appropriately align with the VCCS definitions (see Appendix B, Tables A and B). Examples of how CT was operationalized in 2017-2018 follow:

1. *Students will learn the use and utility of diverse archive document types and their purpose. Students will attempt to use information from these sources to investigate historic topics.* **-- Public History and Historic Preservation, SLO, 100-level course**
2. *Students will be able to use mathematical reasoning to draw logical conclusions and make well-reasoned decisions.* **– Physics, SLO, 100-level course**

There are notable differences in how 100- and 200-level courses operationalize CT. Differences between program-specific courses and general education courses are also present in the operational definitions of critical thinking. Bloom's Revised Taxonomy organizes observable knowledge, skills, and abilities into six categories: remembering, understanding, applying, analyzing, evaluating, and creating. Like many of the methods of assessing CT in 100-level courses, the two examples above operate at the lower half of Bloom's Taxonomy: remembering, understanding, and applying information. In the example above, Public History and Historic Preservation asked students to apply a method common to historians. The method operates at the level of introductory knowledge in history. It is also program-specific, and therefore, this utilization of critical thinking is expected of students in this program, but not from all NOVA students. Physics also assesses students using a SLO at the 100-level, but the physics course assessed serves the multi-disciplinary degrees awarded by NOVA, so the program operationalizes CT more broadly, as it serves a wider group of students.

The operationalization of CT in 200-level courses tends to focus on the taxonomy's higher levels of learning: analyzing, evaluating, and creating. Courses at the 200-level tend to be more differentiated, focusing on the specialized knowledge and skills of a given program. These courses build on 100-level course content, adding to the skills and competencies acquired at the 100-level. At the 200-level, faculty tend to use assessment measures that assume a level of knowledge that students have effectively mastered from previous courses. For example, Automotive Technology operationalized critical thinking in a 200-level course as:

1. *Apply[ing] electrical theory using wiring diagrams and schematics to diagnose and repair automotive electrical circuits.*

Automotive Technology's curriculum map indicates that the knowledge needed to meet this SLO/CLO is introduced in several 100-level courses. It is practiced and mastered in 200-level courses. Contract Management defined critical thinking using program specific knowledge:

2. *Students will be able to recognize and apply fundamental contracting techniques by utilizing the basic federal contracting processes: cost estimation procedures, requirement determinations, and characteristics of best value analysis.*

Again, using the program's curriculum map as a guide, the knowledge needed to achieve this SLO is introduced in several 100-level courses. Building on that knowledge, the SLO/CLO is practiced and mastered at the 200-level.

The examples above use program or discipline SLOs to assess critical thinking. Thirty-two out of 36 programs (89 percent) used one of their SLOs to operationalize critical thinking (Figure 3). Four of the seven disciplines (57 percent) used SLOs to assess critical thinking. Therefore, **83 percent of the critical thinking assessments completed in 2017-2018 are of outcomes that have been assessed in the past, and/or will be assessed in the future.** The use of SLOs to assess critical thinking indicates the degree to which critical thinking is integrated into NOVA courses. It is expected that disciplines will further integrate their SLOs with the College's CLOs and utilize SLOs to conduct CLO assessments in the future.

Figure 3. Critical Thinking Assessments Using Program/ Discipline Student Learning Outcomes: 2017-2018
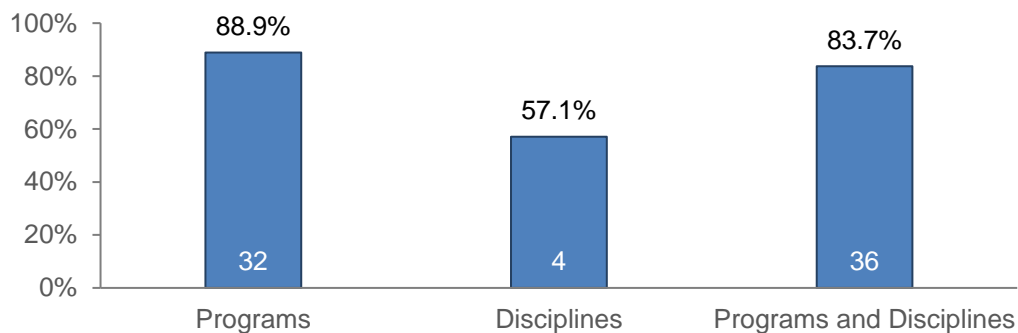
B. Sample Sizes

At NOVA, the faculty determine the appropriate course(s) in which to assess each Core Learning Outcome. If a program or discipline chooses a course with a small number of class sections, it is customary to assess all sections. If the course has multiple sections (10+), the programs and disciplines may ask the Office of Academic Assessment to create a sample from a representative sub-set of courses offered across all campuses/modalities of the College; this sample typically equates to approximately one third of the total sections offered.

The number of students assessed in 2017-2018 exceeded the College's expectations. The assessment of critical thinking involved **4,603** students (Figure 4). Approximately 30 percent of these students were assessed in their educational programs while 70 percent were assessed in a discipline. Figure 4 illustrates the number of students assessed in programs versus disciplines.

In Spring 2018, 36,365 program-placed students were enrolled at NOVA. **Thus, approximately 12 percent of NOVA students participated in the first year of course embedded assessment of the core learning outcomes.** It is important to note that this level of student participation is significantly greater than the past VCCS assessment expectation of at least 50 student participants per community college.

Figure 4. Students Involved in Assessment of Critical Thinking by Programs and Disciplines: 2017-2018
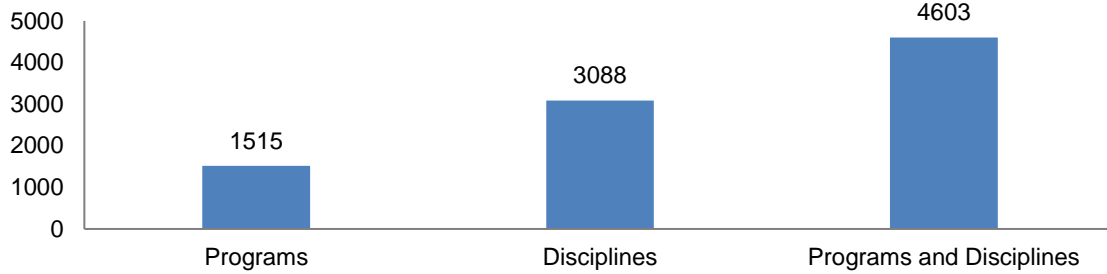
As Figures 5 and 6 indicate, more *students* were assessed in 100-level courses, while more *courses* were assessed at the 200-level. The average course enrollments are higher at the 100-level courses than the 200-level. Thus, more students are assessed in 100-level courses. The reason that there are more 200-level *courses* assessed follows logic, the faculty would want to assess courses where critical thinking is practiced or mastered, which requires a higher-level course.

Figure 5. Critical Thinking Student Sample Sizes by Course Level and Program and Discipline
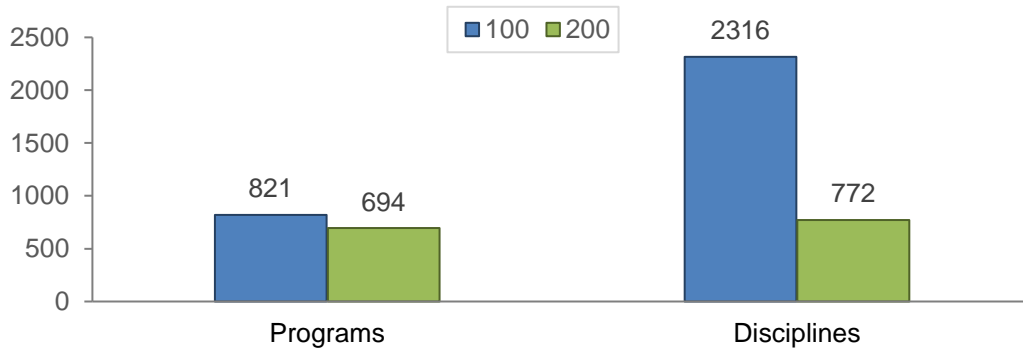
Figure 6. Number of Courses Assessing Critical Thinking by Program and Discipline
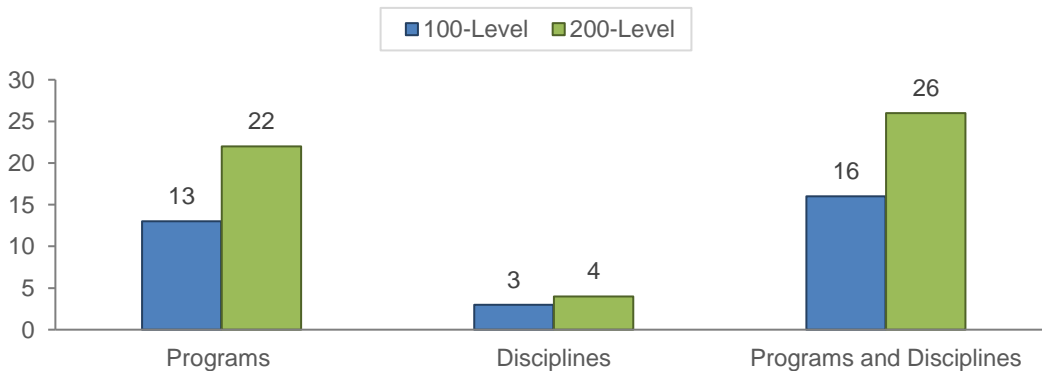
The average number of students assessed in 100 and 200-level courses is a useful baseline for future assessments, while also offering insight into current assessment results. The current course enrollments vary widely across courses at NOVA. One hundred-level courses assessed by non-degree granting disciplines often have large sample sizes. These courses are popular

with students as they satisfy general education requirements for an Associate Degree. For example, Biology assessed 572 students at the 100-level, and Student Development (SDV) assessed 1,744 at the 100-level; see Figure 7. These courses tend to easily transfer to four-year colleges and universities. Meanwhile, courses assessed by degree programs tend to have smaller sample sizes; at the 100-level, the number of students in program sample sizes ranged from 11 – 549 (average sample size is 196). These courses have course content aimed at a particular degree or skill (e.g., Nursing); therefore, fewer students will be enrolled in these courses.

Figure 7. Average Number of Students Assessed in 100 and 200-level Courses by Program and Discipline
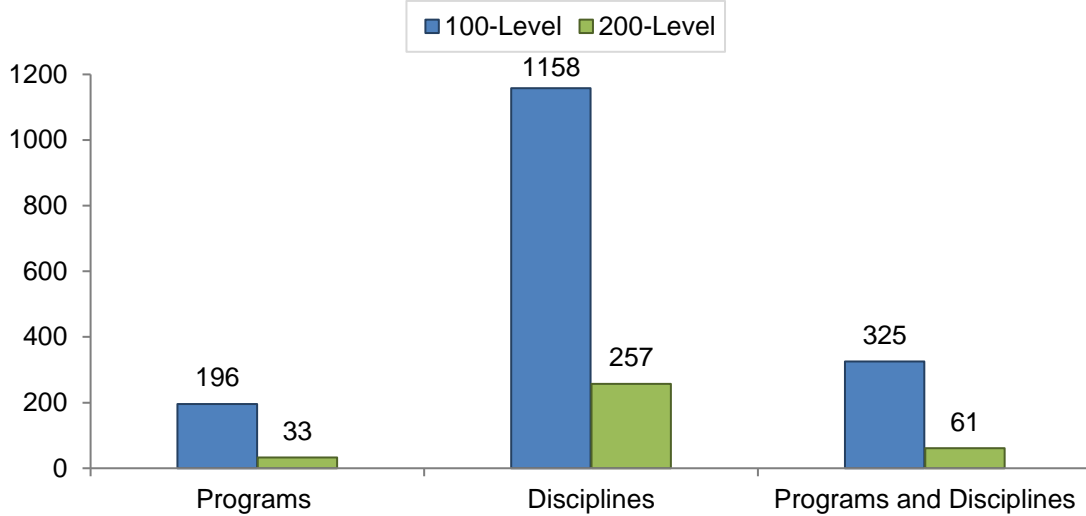
Section III: Measurement of Student Achievement in Critical Thinking

Course embedded assessment requires a minimum threshold of success for student learning. At NOVA this minimum threshold, or target goal, is determined by the faculty of each educational program and discipline, using a variety of measures: national certification exams; standards determined by state licensing agencies or accrediting bodies; criteria designed by the discipline's national association body (e.g., The American Chemicals Society's Guidelines for Lab Safety for Chemistry); or by faculty using their professional expertise.

Target goals are commonly set at a student performance level of 70 percent or better on an assignment or exam. Success regarding target goals signals student achievement of the competencies being assessed. It also signals college-wide student learning. The college aggregates program and disciplines student data to examine student performance on a given CLO, in this case, critical thinking.

Success regarding target goals signals student achievement of the assessed competencies. Achievement of target goals may also signal improvements in the assessment process, the culture of assessment, and student learning. The target goal data is shared with faculty and the public via NOVA's website, campus TV monitors, and various infographics shared at high school events.

Section III focuses on: (1) the methodologies used to assess critical thinking (e.g., how programs/disciplines assessed this CLO and the effectiveness of their assessment method) and (2) how, and to what degree, programs/disciplines and students met target goals.

A. Methods for Assessing Critical Thinking

Major Categories of Critical Thinking

To assess civic engagement college-wide, the Office of Academic Assessment collated the data from all assessment measures of CT: assignment descriptions, exams, and rubrics, noting key terms used. Then these key terms are organized into lists of "like-minded" terms. For critical thinking this process resulted in eight distinct types of CT assessed in 2017-2018. These categories were then used to parse the program and discipline data into college-wide CT data. Table 5 delineates the eight college-wide categories of CT.

Table 5. Major Categories of Critical Thinking

Category	Description
Identification of Concepts	Assesses how well students identify concepts or topics.
Explanation/Identification of Issues	Assesses how well students identify and/or explain issues relating to the assignment. (*This is different from Identification of Concepts because students must understand what issues arise from concepts discussed in class.*)
Evidence Utilization	Asks students to include supportive evidence to boost arguments/ solutions/ research credibility.
Context/Stakeholder Recognition	Assesses how well students identify contexts to apply concepts/theories and/or how stakeholders are affected by the issue or solution.
Perspective/Position	Assesses how well students provide their own perspectives and how well the students consider other perspectives.

Analysis	Assesses how well students: analyze the situation; determine credibility of sources; find practical solutions; and consider alternative solutions.
Creative/Innovative Thinking	Assesses students' ability to "think outside of the box"; come up with practical solutions in a non-conforming manner.
Problem Solving	Assesses students' ability to find solutions to an issue by utilizing various sources of evidence and examining all perspectives.
Other	

Program and discipline critical thinking assessment measures are coded using these categories. Collapsing the variety of assessment measures into eight categories allows for a conversation about critical thinking assessment across NOVA. It is important to note that one rubric or exam may ask students to engage in more than one category of CT. Therefore, the number of instances of CT coded is higher than the number of program and discipline assessment measures. For example, students engaged in critical thinking six times to complete Diagnostic Medical Sonography's assessment measure. Students are required to explain/ identify an issue twice; take the perspective of the other person once; conduct an analysis twice; and utilize creative/innovative thinking once.

The faculty of 31 programs and disciplines used rubrics to assess CT.[2] Twelve programs and disciplines used exams. Across all rubrics and exams, 151 instances of critical thinking assessments were coded using the categories in Table 5. Programs assessed 117 instances of critical thinking skills, and disciplines assessed critical thinking in 34 instances (Figure 8).

Figure 8. Critical Thinking Criteria Assessed by Programs and Disciplines Using College-Wide Categories
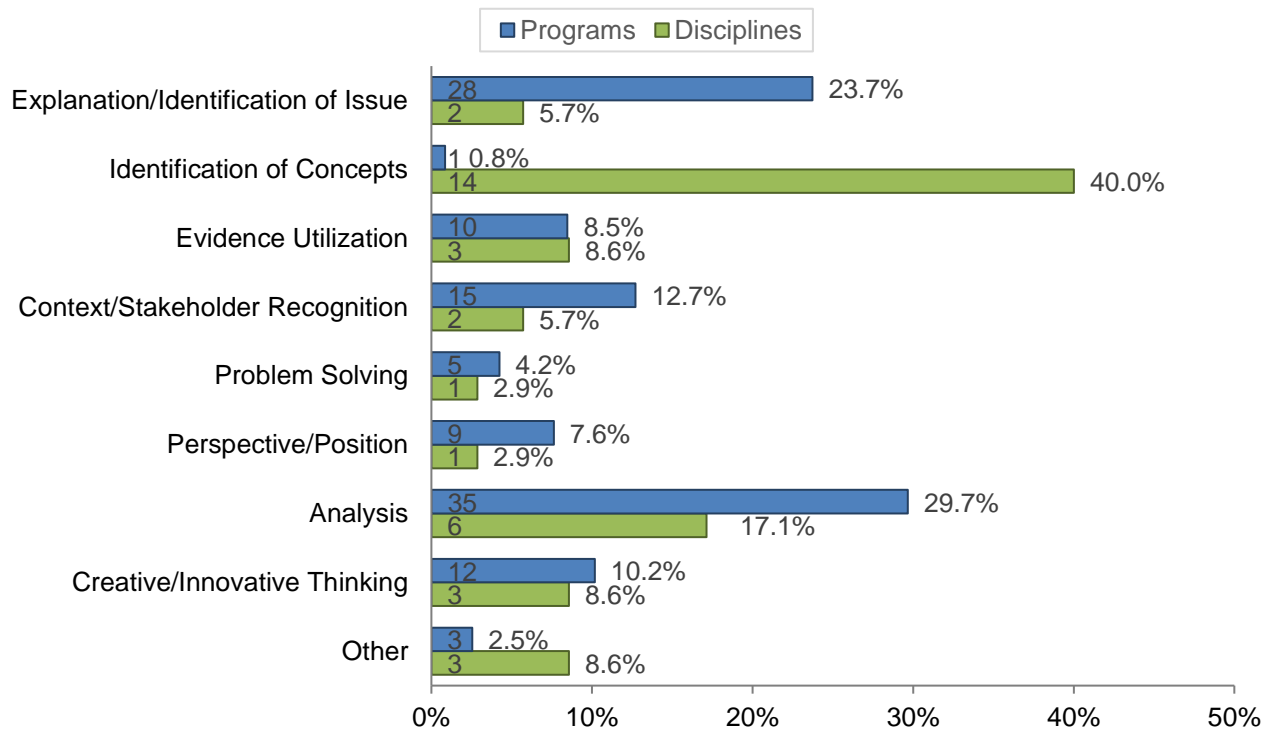
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Two categories of critical thinking account for almost 50 percent of the assessments: analysis and the explanation/identification of an issue (Figure 9). The distinction between the explanation/identification of an **issue** and the explanation/identification of a **concept** is an important one. Analysis is inherent in explaining/identifying an **issue**. Students are expected to understand the different sides and analyze how their arguments are similar and different to one another. Under these conditions, explaining an **issue** is considered analysis, while identifying a concept is more rote. Using Bloom's Revised Taxonomy, these instances of CT assessment fall into the upper half of Bloom's six categories, as analysis is the third level of knowledge expression. Additionally, programs and disciplines utilized creative/innovative thinking, the capstone of Bloom's Revised Taxonomy, approximately ten percent of the time (Figure 9).

About 18 percent of the items coded as critical thinking require metacognition (Figure 9). While metacognition is not a part of Bloom's Taxonomy, it is useful to examine the level of critical thinking in action. Items coded as context/stakeholder recognition and perspective/position operate as metacognition. Critical thinking is often defined as metacognition because applying concepts/theories to a given issue/problem requires the thinker to examine how their perspective influences their approach to the issue/problem (terrorist or freedom fighter). Furthermore, the following skills/knowledge operate at the level of meta-cognition: the ability to consider how one's own thinking/beliefs influences decision making and the ability to understand the perspective of others, labeled above as context/stakeholder recognition and perspective/position.

Following this logic, 78 percent of the items coded as critical thinking employed analysis, creative thinking, or metacognition. As discussed in the paragraphs above, each of these types of CT operate at higher orders of thinking (Figure 9).[3] NOVA's rubrics and exams are assessing student learning of CT at a more sophisticated level than expected for this first assessment.

Figure 9. Critical Thinking Criteria Assessed in Rubrics and Exams[4]

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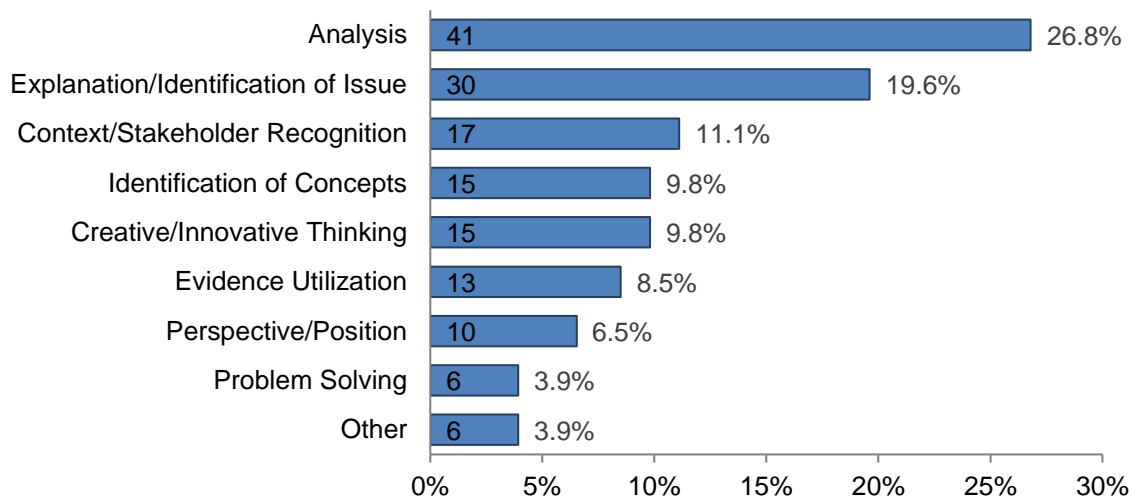
[3]In this instance analysis encompasses the categories analysis (27%) and explaining/identifying an issue (20%); metacognition encompasses Context/Stakeholder Recognition (11%) and Perspective/Position (7%)
[4] Numbers on the base of the bars in the graph above indicate absolute values while numbers on the outside of the bar indicate percentage of programs using each category.

Using exams it is difficult to assess the highest levels of thinking on Bloom's Revised Taxonomy, evaluating and creating knowledge. Multiple choice questions, the preferred exam format in 2017-2018, do not easily facilitate creative thinking. However, of the 12 programs and disciplines using exams as their method of assessment, these exams incorporated creative thinking seven percent of the time (Figure 10).

Rubric items coded as critical thinking spread across the eight categories of CT fairly evenly, with only three categories dropping below double digits: problem solving, perspective/position, and other (Figure 10). The remaining categories were used fairly consistently, with a range between 10 percent and 23 percent.

Figure 10. Critical Thinking Criteria Assessed by Method
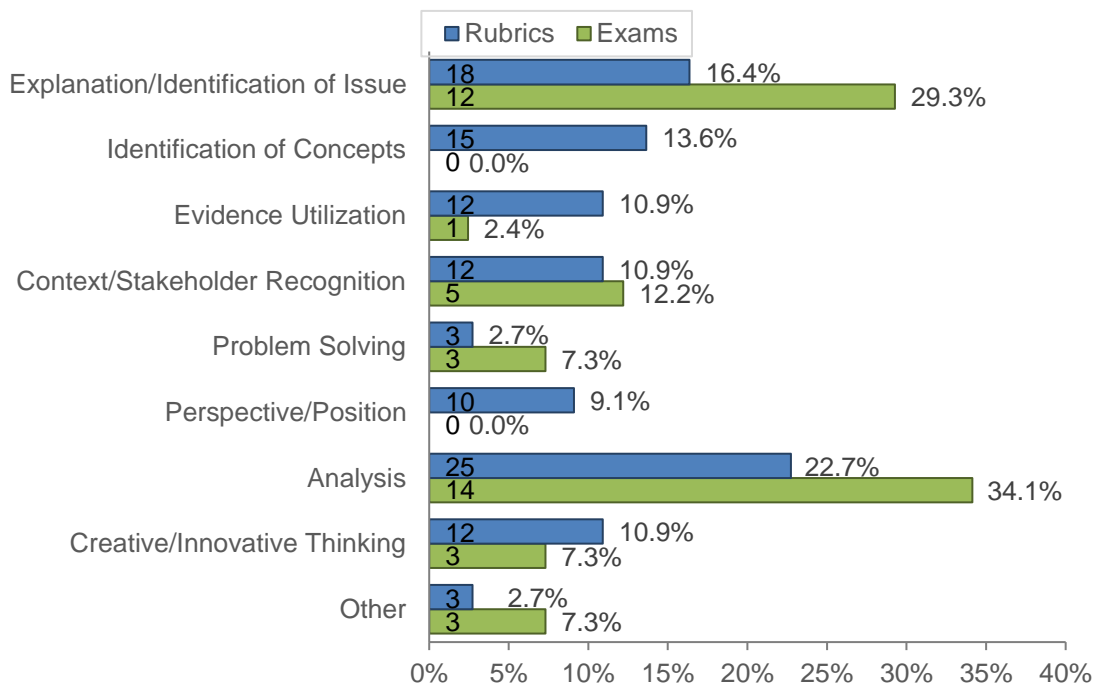
Assessment Measures' Alignment with the Critical Thinking Competency

To ensure NOVA's assessment of CT accurately reflected the VCCS definition of critical thinking, all CT assessment measures were coded using the elements in Table 6. Each individual test/rubric item identified as CT was counted. For example, an exam question requiring three different types of critical thinking would score a three. Coders noted, by category, each element requiring critical thinking on every measure. Therefore, the number of items categorized as CT is greater than the number of assessment tools used to assess critical thinking.

Beyond coding instances of critical thinking, rubrics and exams were examined to assess the clarity of the operational definitions of CT (Table 6). Sample sizes were categorized (small, medium, or large). Assessment methods were examined for their alignment with relevant operational definitions of CT. Finally, student achievement on the assessment was compared to the target goal set by the faculty.

Table 6. Coding Descriptions of Assessment Method and Target Data

Category	Description
Operationalization (O)	Program/discipline provided an operationalized definition of the CLO that was clear and measurable; includes actions students will take to demonstrate learning of this outcome (e.g., demonstrate proficiency in, analyze data, interpret information, etc.)
Sample Size	*SSS – Small Sample Size:* Samples with 33 students or fewer.
	MSS – Medium Sample Size: Samples between 34 and 69 students.
	*LSS – Large Sample Size: S*amples over 70 students.
Outcome-Method Alignment (OMA)	Method/assignment used effectively measures the operationalized CLO.
Rubric/Measure	*Rubric in APER (R):* Separate Rubric/assessment measure and/or grading scale was not provided but was explained in the *APER*.
	No Rubric Provided (NRP): No rubric was provided either with the *APER* submission email or in the *APER*.
	Assignment-Specific Rubric (ASR): Rubric designed to evaluate the CLO being assessed and one or both of the following aspects: 1. Clear description of grading criteria/grading scale is provided. 2. Provides purpose of assignment
	Generic Rubric (GR): Does not directly evaluate the CLO being assessed, is too generic, grading scale not provided, no purpose presented.
Examination	*Outcome-Specific Examination (OS):* The exam questions evaluate the assessed CLO by addressing 3 or more aspects of the CLO.
	Generic Examination (GE): The exam questions do not fully evaluate the assessed CLO. Only assessed 2 or fewer of the concepts and/or is unrelated to the CLO.
Target	*Criteria Target (CTA):* Target was met in 75% of the criteria, but not overall.
	Overall Target (OT): Target was met overall.
Other (OTH)	

Analysis of the assessment measures found that 93 percent (or 40/43) of programs' and disciplines' assessments clearly aligned with the VCCS critical thinking competency. This means, that in this first year of CLO assessment, NOVA faculty successfully created assessment methods for examining student learning of critical thinking.

Approximately half of the critical thinking rubrics used detailed criteria to assess student work. Such rubrics are categorized as assignment-specific rubrics. Conversely, about 52 percent of the critical thinking rubrics either lacked detail or were missing elements important to facilitate student understanding (Figure 11). These rubrics are categorized as generic rubrics (Table 6).

It is important to note that there is no identifiable correlation between using a general rubric and a program's or discipline's ability to meet their target goal. Out of 13 programs/disciplines with general rubrics, 11, or about 85 percent, met or exceeded their targets (Figure 11). Programs and disciplines will be encouraged to indicate the pedagogical goals of their assessment measure and clarify assessment criteria for the faculty in the future.

Twelve programs and disciplines used exams when assessing CT. Approximately 67 percent of the exam questions were outcome-specific (see Figure 11). Exam items are outcome-specific if they assess three or more categories of critical thinking (Table 6). Educational programs and disciplines' exams were considered generic if they assessed two or fewer critical thinking categories in their exam questions (Table 6). Programs and disciplines that used generic exams

will be encouraged to reconsider their exam questions in the future and make them more outcome specific.

Figure 11. Percentage of Programs and Disciplines Using Outcome-Specific and Generic Rubrics and Exams
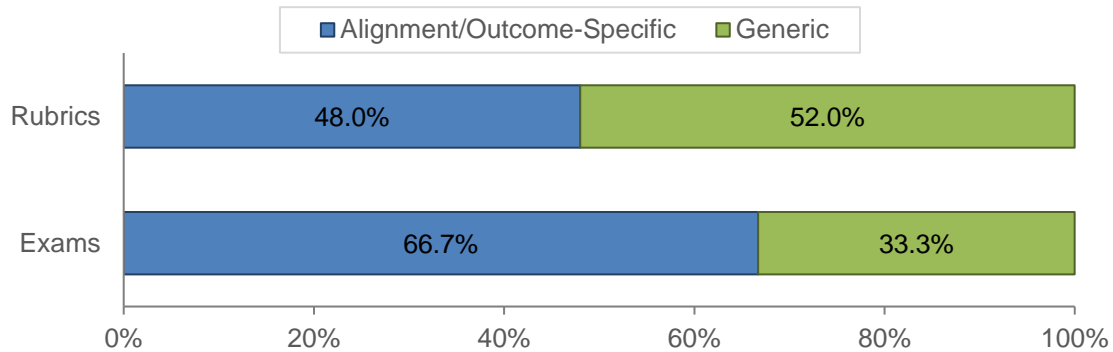
The following are examples of programs and disciplines using outcome-specific rubrics and exams:

1. An example of an Assignment-Specific Rubric is **Music Recording Technology**'s use of NOVA's critical thinking rubric when assessing student learning. The rubric is well tested, having been originally developed by Northeastern Illinois University (see Appendix D). The rubric is detailed, touching upon multiple categories of critical thinking: explanation/identification of issues, evidence utilization, context/stakeholder recognition, perspective/position, and analysis.
2. The **Medical Laboratory Technology** program created an outcome-specific exam using questions of identification and analysis. While assessing students' ability to identify a variety of abnormalities in a blood smear, the faculty created questions requiring students to engage three types of critical thinking: identification and explanation of issues, context/stakeholder recognition, and analysis (Table 6).
3. **Sociology** created an outcome-specific exam by asking students to critically engage with information concerning cultural relativism and depressed sociological conditions. Students read a short article during the exam, then responded to questions requiring them to extrapolate conclusions from information mentioned in the article. This exam required students to use three types of CT: identification of concepts, analysis, and creative/innovative thinking.

Only three programs' assessment methods did not clearly align with the VCCS definition of critical thinking. For example, in 2018-2018 a NOVA program employed a semester-long research project to assess critical thinking. This project culminated in a research paper; however, the rubric used by the faculty largely assessed writing, not critical thinking. Of the rubric's six criteria, only two could be considered critical thinking: research and quality of content.

B. Achievement of Critical Thinking Target Goals

There are two sample sets to discuss via target goals. The first sample set is the programs and disciplines. As a college, NOVA examines the degree to which disciplines and programs met the

target goals set for their students. The second sample set, via target goals is students. The Office of Academic Assessment aggregates the programs' and disciplines' student data into one data set. When discussing target goals, this audit addresses both data sets.

Target goals are generated internally by programs and disciplines. They are the minimal acceptable student score on their critical thinking assessment measures. In their APERs and CLO Reports, programs and disciplines report on student ability to achieve their target goals. They then analyze the results and take measures to improve student learning. The Office of Academic Assessment compiles the program and discipline data analyzing how well individual programs and disciplines are meeting their target goals.

The Office of Academic Assessment uses the aggregate student data to measure how well students, college-wide, are meeting critical thinking target goals. This data is reported in the annual core learning outcome assessment audits. It is also available on the NOVA website in the form of infographics. The infographics summarize the student data for our faculty, students, and the public. These infographics are also broadcast on the tv monitors on all NOVA campuses.

When assessing target goals, student success at reaching those goals is categorized via four categories: exceeded target (i.e., students exceeded the target goal by 10 percent or more); met target; partially met target; or did not meet target. In 2017-2018, of the 43 programs and disciplines assessing critical thinking, about **84 percent programs or disciplines exceeded, met, or partially met their target goal scores** (Figure 12).

Overall, 4,603 students participated in the assessment of critical thinking at NOVA. Of this sample, 53 percent of students exceeded or met their program/discipline's target goal (Figure 12). Additionally, 40 percent of students partially met the target goals. Seven percent did not meet the target goal (Figure 12).

Figure 12. Critical Thinking Target Achievement of Programs/Disciplines and Students Overall
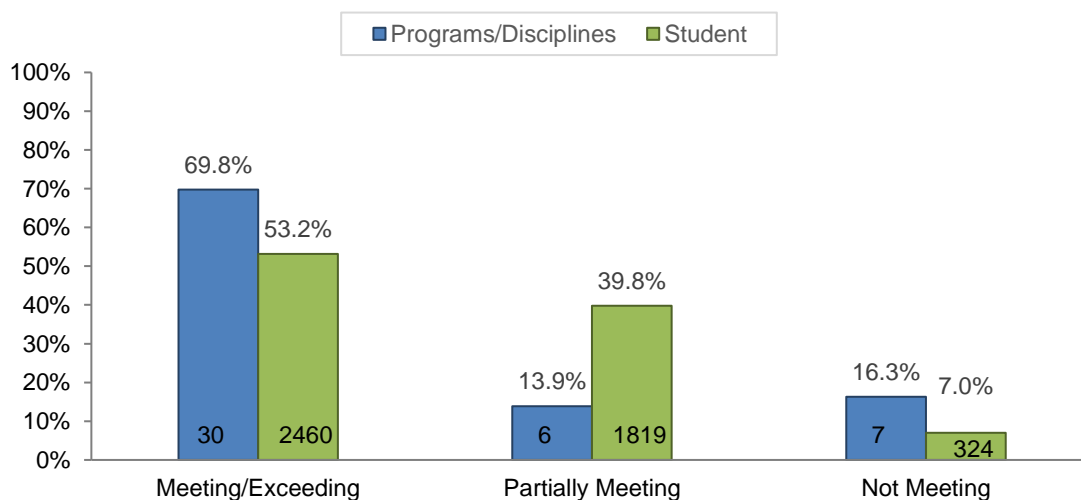
Disaggregating program and discipline target goal data by 100-level and 200-level courses reveals important differences (Figure 13). First, 63 percent of NOVA courses assessing students at the 100-level met or exceeded their targets. At the 200-level, 74 percent of the educational programs and disciplines met or exceed their target.

Most notably, while the Biotechnology, A.A.S. degree program did not meet their target rate of 80% in the 2017-2018 assessment of critical thinking, they were able to see significant improvements by implementing actions based on results of their last assessment of critical thinking (2015-16). In both 2015-16 and 2017-18, students were assessed on their ability to apply the scientific method through a lab notebook assignment and writing a scientific paper. In 2015-16, 18% of students met the target goal for scientific papers and 64% for the lab notebook assignment. Based on these results, faculty performed three key actions: (1) increase guidance in completing the lab notebook assignment and preparing scientific papers; (2) improve alignment between the lecture portion of the course and the lab course; and (3) require students to participate in journal club activities where they dissect and present scientific literature. These three actions led to 47% (29% increase) of students meeting the 80% target rate for the scientific notebook assignment and 69% of students (7% increase) meeting the 80% target rate for the scientific paper assignment in 2017-2018.

Figure 13. Critical Thinking Target Achievement of Programs and Disciplines Achieving Critical Thinking Targets by 100-Level and 200-Level Courses[5]
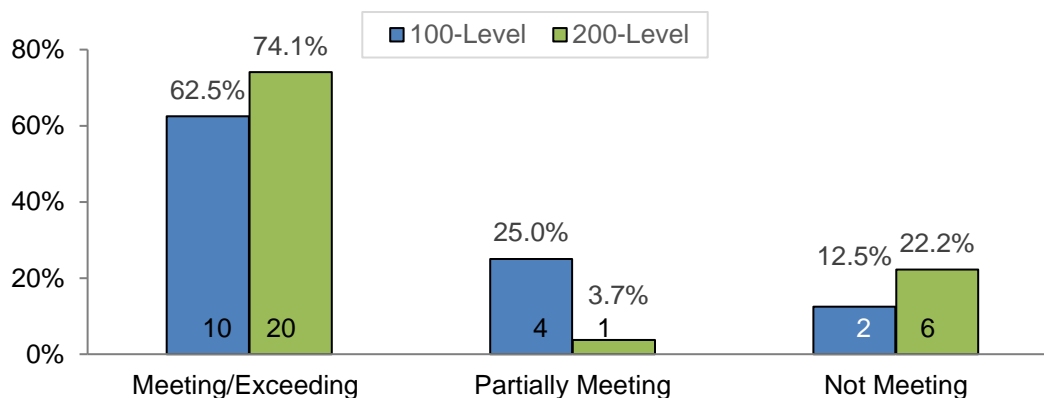
The eight programs and disciplines not meeting their targets reported two common difficulties. The first: creating a representative student sample across campuses, modalities, and class sections. Faculty charged with organizing the assessment process sometimes had difficulty engaging their peers in data collection. Additionally, there is a learning curve to successfully capturing off-site dual enrolled and online students for the sample. The provosts, deans, program heads, discipline chairs, and other administrators are working together to improve sample construction. The second: difficulties with the assessment method. Programs and disciplines with the following issues did not meet their target goals: (1) assessment measures were not closely aligned with the operational definition of critical thinking; (2) an overly generic rubric; and/or (3) an above average target goal.

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[5] Programs and disciplines assessing both 100- and 200-level courses were counted in both categories. Those using graduate surveys were counted as assessing 200-level courses.

When disaggregating student data by 100-and 200-level courses, differences arise. Students at the 200-level are more likely to *meet or exceed target goals* (Figure 14). Students at the 100-level, are more likely to *partially meet* their target goals (Figure 14).

The higher success rate at the 200-level, when compared to the 100-level, can be explained by one factor: the populations are slightly different. Almost half of the 100-level students assessed are in general education credit courses (2,316 of 4,868 students), the population of these courses is "all NOVA students." At the 200-level, the population is "students specific to the program, with specialized knowledge." This second population has an inherent advantage, a specific foundation of knowledge earned at the 100-level inside the program. The targets are more rigorous at the 200-level, but the students are products of self-selection. Students inclined towards success in the program's 100-level courses are more likely to remain in the program, and they bring that foundation with them into the 200-level courses.

Figure 14. Critical Thinking Target Achievement of Students by 100-Level and 200-Level Courses
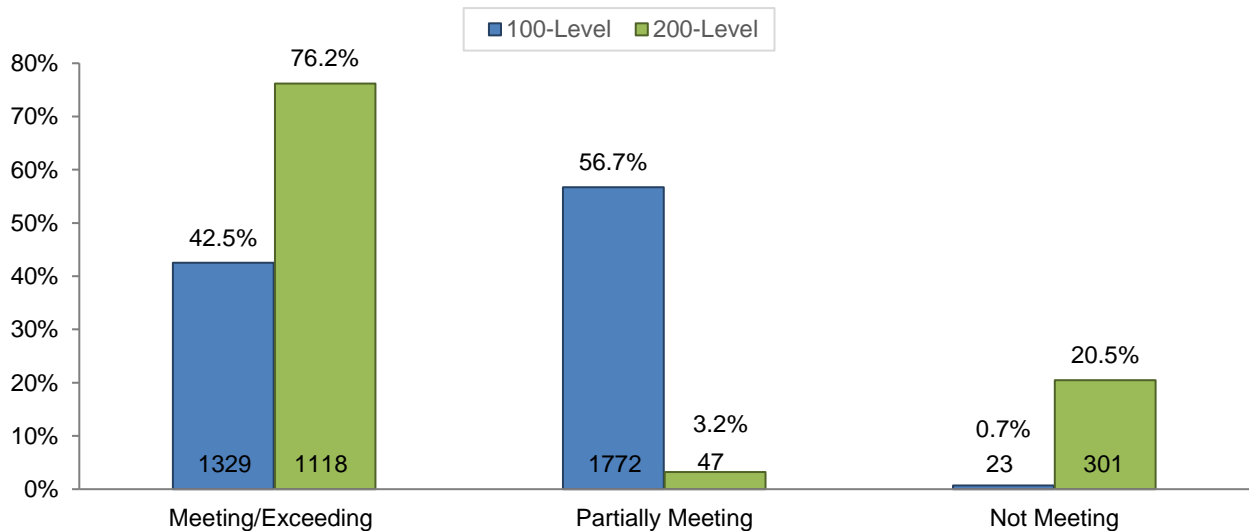
Section IV: Actions to Improve Student Learning

Using assessment results to improve the assessment and learning process is essential to continually improving student learning. Therefore, closing the loop, or presenting the assessment findings to the faculty is the last step, (before the cycle begins again). The faculty use the assessment results to make alterations to the processes to improve assessment and/or learning. This section of the report examines the changes presented in the Use of Results section of the APERs. The changes outlined in the Use of Results discussion are coded into five major categories: curriculum specific changes, changes regarding program resources, changes regarding co-curricular resources, changes in the assessment process, and changes made at the college-level (Table 7; See Table F in Appendix A for Descriptions and Examples of Major and Subcategories. See Table H in Appendix A for Use of Results by Subcategory in Descending Order of use).[6] Each category has sub-categories. The aggregation of this data allows for the assessment of the college-wide changes used to improve the assessment process and student learning.

Table 7. Use of Results Codes: Major and Subcategories

Major Category	Subcategories
Curriculum-Specific	Curricular Change
	Course Revision
	Pedagogy
	Subject-Matter Expert Feedback
Program Resources	Financial
	Human Resources
	General Resources
Co-Curricular Resources	Co-Curricular Opportunities
	Academic Support/Advising
SLO Assessment Process	SLO Assessment Change
	Data Analysis Method Change
	Student Learning Outcome Change
	Target Increased
	Target Decreased
	Target Clarified
	Sample Size
	Communication on the Assessment Process
College-Level	Dual Enrollment
	Articulation Agreement
	Recruitment/Marketing

A. Analysis of Actions for Improvement by Major Category

The 43 programs and disciplines assessing critical thinking described 267 actions to improve students' critical thinking skills and the assessment process. This averages to six actions for

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[6] This section of the report focuses on the most utilized major categories and relevant associated subcategories. Data for all the Use of Results subcategories can be found in Appendix A, Tables I, J-Q. Additionally, the code sheet includes an "Other" category, but it has not been used in several years, so it is not considered in this report.

improvement per program or discipline (see Appendix A, Table I). This demonstrates that programs and disciplines use their assessment data to plan and seek improvements.

Approximately 48 percent of the actions taken, or planned, to improve assessment student learning were curriculum specific (Figure 15). This is the most frequently used category of actions. At 33 percent, changes to the assessment process are the second most frequently mentioned (Figure 15). Programs and disciplines tend to make, or plan for, changes in areas over which they have control. Therefore, there are few attempts to make changes to: resources (new faculty, facilities, etc.); increase the use of co-curricular resources; or make college-level changes (Figure 15).

Figure 15. Actions to Improve Students' Critical Thinking Skills and the Assessment Process
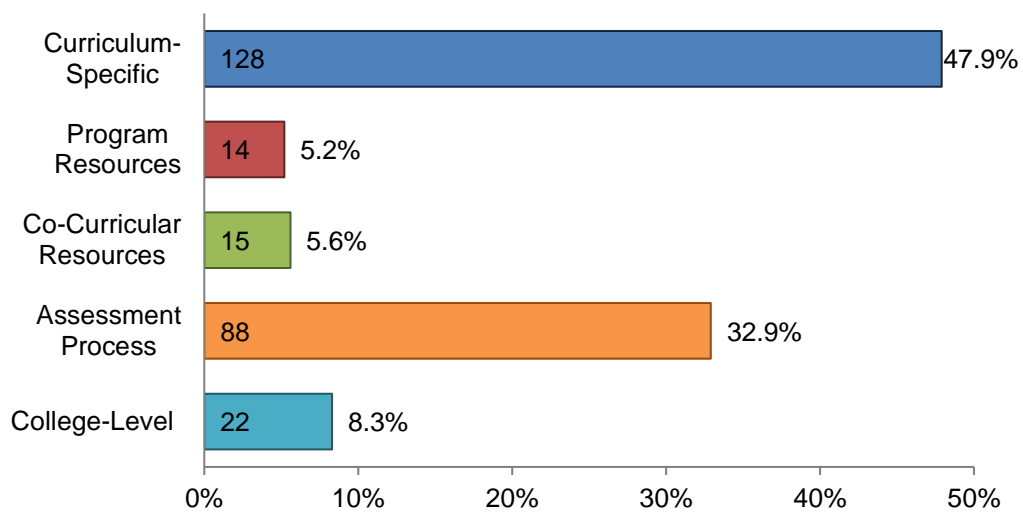
Data disaggregated by program and discipline reveals that programs and disciplines are at different stages in the assessment process (Figure 16). Typically, it is best practice to refine data collection and analysis techniques prior to making curricular changes. As mentioned previously, 2017-2018 is the first-year disciplines reported on the assessment process. In line with best practice, 71 percent of the disciplines' changes were made in their assessment process (Figure 16). Meanwhile, programs have been assessing student learning outcomes for some time, explaining why the majority of their actions are curricular based, with only 24 percent of their actions being assessment oriented (Figure 16). These programs have more developed assessment processes, so most of their actions, 55 percent are oriented towards improving student learning of critical thinking (Figure 16).

Figure 16. Actions to Improve Students' Critical Thinking Skills Learning and Assessment Process by Programs and Disciplines

Legend: ■ Program ■ Discipline

Curriculum-Specific
- Program: 118 — 54.9%
- Discipline: 10 — 19.2%

Program Resources
- Program: 9 — 4.2%
- Discipline: 5 — 9.6%

Co-Curricular Resources
- Program: 15 — 6.9%
- Discipline: 0.0%

Assessment Process
- Program: 51 — 23.7%
- Discipline: 37 — 71.2%

College-Level
- Program: 22 — 10.2%
- Discipline: 0.0%

(x-axis: 0%, 20%, 40%, 60%, 80%)
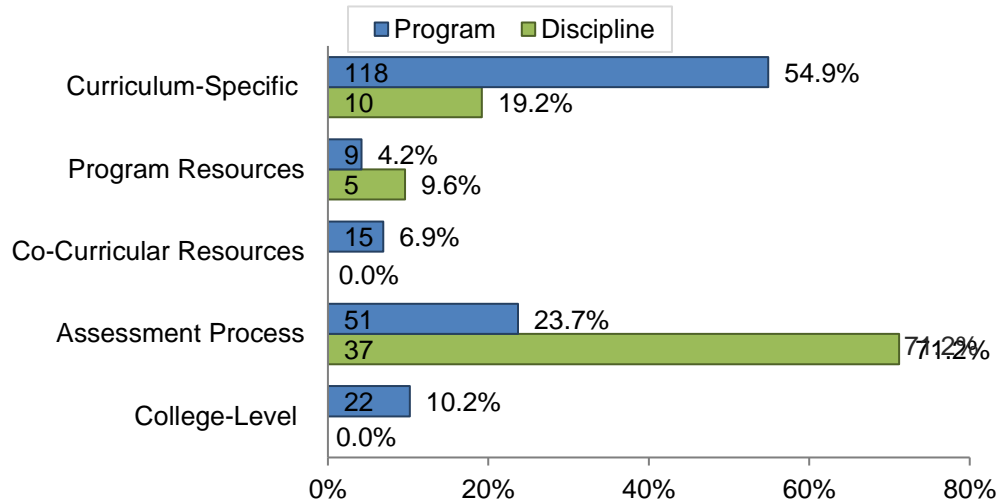
B. Key Actions to Improve Critical Thinking Outcomes by Program and Discipline

Assessment Process Actions

The most frequent changes made to the assessment process are changes related to the assessment method itself and/or disaggregating the CLO components (Coded as "CLO Assessment Change"). In 2017-2018, disciplines made 13 changes in this area while programs made 11 changes (Figure 17).

Programs reported 28 changes in their method of data analysis (Figure 17). Data analysis method changes focus on collecting or analyzing data, including the development and implementation of new rubrics. This subcategory is the most frequently coded change made by programs.

Both programs and disciplines made 11 changes in their communication with faculty about assessment (Figure 17). Creating best practices for administering the assessment measure, communicating the need to spend more time on a topic, and communicating assessment results are all forms of interactions coded as changes in communication.

Figure 17. Key Actions to Improve the Assessment Process by Programs and Disciplines

Legend: ■ Program ■ Discipline

CLO Assessment Change
- Program: 45.8% (11)
- Discipline: 54.2% (13)

Data Analysis Method Change
- Program: 82.1% (28)
- Discipline: 17.9% (5)

Communication
- Program: 50.0% (11)
- Discipline: 50.0% (11)

(y-axis: 0%, 20%, 40%, 60%, 80%, 100%)
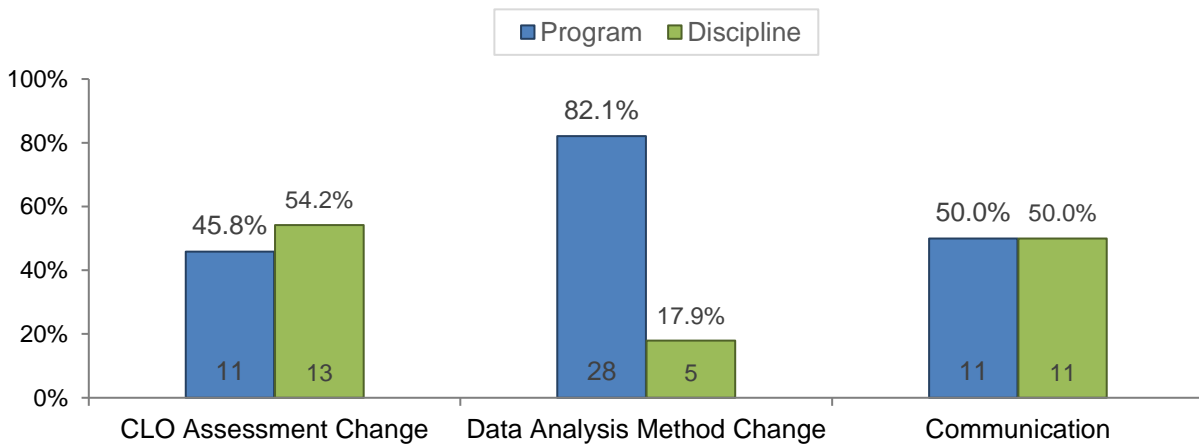
Curriculum-Specific Actions

In 2017-2018, programs made most of their changes in areas concerning improving student learning. Programs assessing critical thinking made 19 curricular changes (Figure 18). Curricular change concerns broad changes to the degree program: adding a course or other requirement; changing course sequences or the program focus; or the availability and/or modality of a course.

Course revision was the most frequent curricular change, with 65 actions in course revision by programs and 8 actions by disciplines (Figure 18). Course revision refers to shifting the artifacts/content students use to learn: modified assignment; changed textbook; added or modified study guides, checklists, or other course handouts; revisited course topics for greater comprehension; emphasized/improved content; posted material online; added rubric; added review session or practice test; revised time spent on topic, or remediation. Following course revision, programs made 28 actions in pedagogy (Figure 18). Pedagogy refers to *how* students learn: fewer/more lectures, more student involvement (class discussion or small group work), or more interactive or experiential activities.

Figure 18. Key Actions to Improve Curriculum by Program and Disciplines
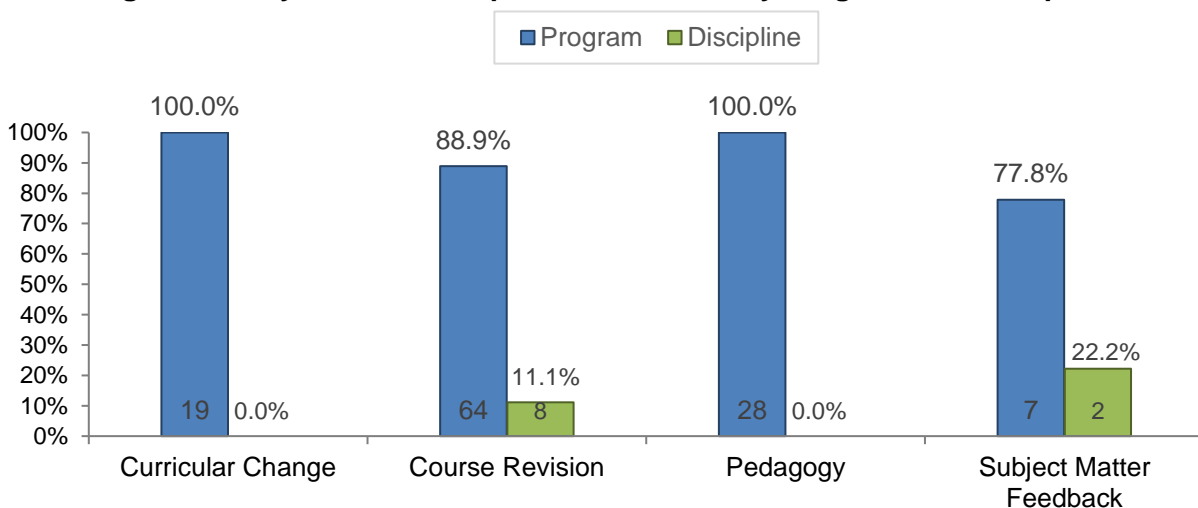
Disciplines made curricular changes in two areas: course revision and subject-matter expert feedback. Meanwhile, programs made changes in almost all subcategories of curriculum-specific actions (see Appendix A, Table P). As Figure 18 indicates, course revision was utilized eight times by disciplines. They used subject-matter expert feedback seven times. In combination with course revision, gaining subject-matter expert feedback helps disciplines improve their curriculum. These actions indicate that disciplines are thinking from a macro perspective. It is likely that once disciplines' assessment methods are stabilized, they will shift focus to the curriculum.

Section V: Working Group Comments and Recommendations

The Critical Thinking (CT) Working Group considers the data presented in this critical thinking audit. The meeting is intended to be discussion-based, ending with suggestions for future critical thinking assessments at NOVA. This section of the audit discusses working group participants, highlights from the discussion, and highlights from the responses to the Zoom polls.

A. Critical Thinking Working Group Participants

Thirty-six deans, provosts, and faculty members attended the 2017-2018 Critical Thinking Working Group Zoom meeting. Initially, invitations were sent to the faculty and administrators involved in the 2017-2018 assessment of critical thinking. We also invited new faculty and administrators preparing for the 2020-2021 critical thinking assessment. Figures 19 and 20 below detail the attendee's position and rank at NOVA as well as their home campuses.

Those who accepted the invitation by the registration deadline received a draft of this audit prior to the working group meeting. During the meeting, the Office of Academic Assessment presented the highlights of this audit as a starting point to a discussion around critical thinking assessment at NOVA. Throughout the presentation, Zoom's chat and polling functions were used to gather both qualitative and quantitative data.

After the meeting, attendees were sent a copy of the PowerPoint, and a survey concerning the usefulness and quality of the working group meeting. The survey also included questions on potential future CT meetings and interest in a Canvas page for CLO assessments, which were two areas attendees showed interest in during the meeting. When the next CT meeting is planned, everyone invited to this meeting will receive an email invitation with details.

Figure 19. Distribution of Working Group Participants by Position
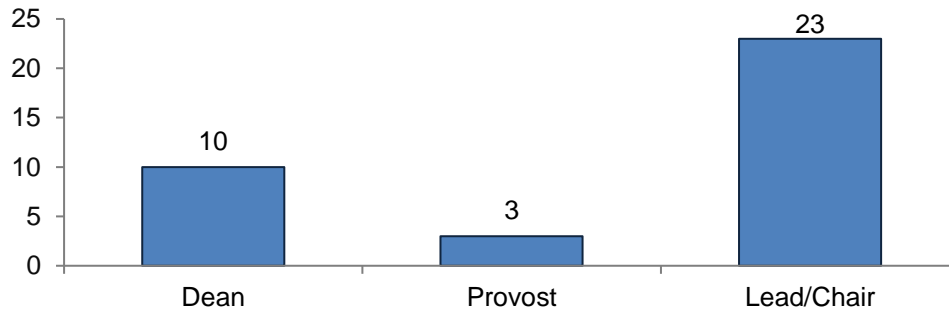
Figure 20. Distribution of Working Group Participants by Home Campus

B. Working Group Discussion Highlights

Participants made the following suggestions for improving critical thinking assessment at NOVA:

- Include core learning outcome infographics on relevant Canvas course sites.
- Continue/broaden good working relationships with full-time and part-time faculty for SLO Leads, Chairs, administrators, and the assessment staff.
- Provide faculty more advanced notice concerning the CLO assessments.
- Post critical thinking related assessment exam questions or prompts, rubrics, sample innovative assignments, and other assessment measure information on Canvas to support faculty assessment.
- Create a long-term assessment schedule (five years or so) for program/discipline specific assessments. Such a schedule will improve the organization and execution of annual assessments. In addition, a schedule will create the lead-time needed to provide assessment materials for distribution to Dual Enrollment (DE) and NOVA Online faculty.
- Work directly with DE contacts, Associate Director of Instructional Design and Development (Alex Case) or Director of Online Learning (Dawn Kolakoski), to set assessments and gather data.
- Be sure to involve adjuncts in the assessment process as they comprise a great number of faculty.

Clearly and consistently remind faculty that SLO/CLO assessment data is to improve student learning, and not for evaluating faculty. A majority of working group members stated hesitation from adjuncts to provide assessment data for fear of accountability. The Working Group produced useful suggestions for improving assessment and student learning, as well as a participant interest in continuing the discussion of critical thinking at NOVA. Despite this, the conversation was not as lively as the assessment staff had hoped, with only a few faculty members contributing to the conversation. Two factors seemed to inhibit conversation. The nature of a Zoom meeting is the first inhibiting factor. Faculty, administration, and staff at NOVA are still learning to effectively use Zoom. Creating lively conversation via Zoom is not a skill well-honed by most persons communicating on the platform. Improving the use of this product is part of the learning process.

Second, the content heavy PowerPoint. As the presentation was the organizational structure of the meeting, the meeting leaned too much towards transmission of content and not enough towards discussion of that content. While the attendees expressed appreciation for the workshop and its content, the goal of the Working Group – to collaboratively create ideas to improve assessment and student learning – was less successful. The Working Group generated many great ideas, but the format was not as discussion oriented as desired.

Using this lesson, format of the quantitative literacy Working Group will focus on generating discussion; the meeting will be driven by questions, rather than the distribution of information. As well, the Office of Academic Assessment will emphasize the discussion format of the Working Group.

C. Working Group Polling Questions Highlights

The Office of Academic Assessment launched seven polls throughout the CT Working Group meeting. Figure 21 indicates the response rate for each poll. Please note the number of questions varied by poll.[7] The attendee poll participation rate was lower than expected. Upon reflection the assessment staff noted that most questions were aimed at faculty, but about one third of the attendees were academic administrators. In future working group meetings, the poll questions will address both faculty and administrators. This section discusses the useful data collected by some of the Zoom polls.[8]

Figure 21. Response Rate for Working Group Zoom Polls
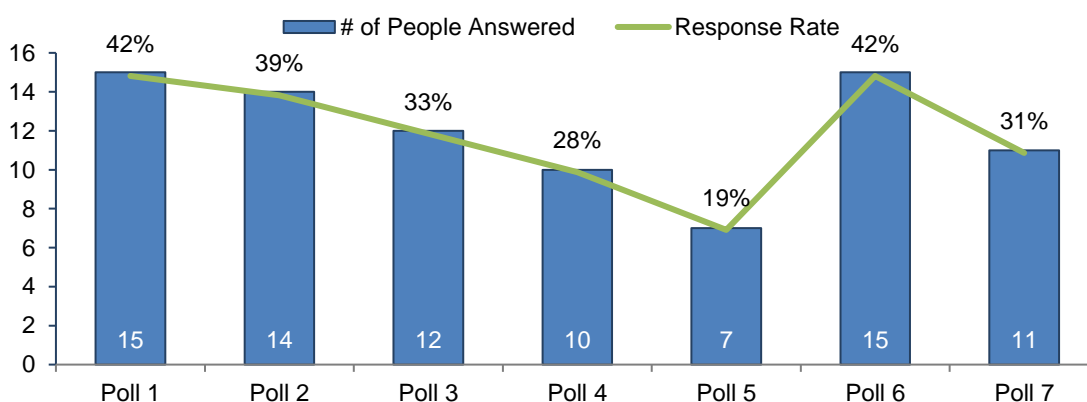
The polls provided useful data for future college-wide assessments. The first poll, consisting of two questions, found that 64 percent of participants have had difficulty getting their full-time and part-time peers to participate in college-wide assessment. As seen in the discussion section above, attendees had several suggestions to improve faculty participation.

Of the twelve attendees responding to the third poll, 33 percent felt their 2017-2018 critical thinking assessment measure could have been more rigorous. Finding the appropriate level of intellectual engagement for students in a new assessment endeavor takes time and fine tuning. The data coming from the 2020-2021 CT Working Group will be compared to this data.

Fifteen attendees responded to the 6th Zoom poll, which concerned faculty interest in a set of college-wide critical thinking criteria. Ninety percent of respondents indicated they would appreciate a set of non-binding CT categories to use.

Closing the loop is a central part of the assessment process, not simply for faculty and staff, but for students as well. To this end, the Office of Academic assessment constructed graphics for each CLO, one relating the CLOs to job skills, and four infographics reporting target data for the CLOs. The CLO graphics are in rotation on the campus-wide tv monitors. To ascertain the success of "getting the word out" about core learning outcomes, we asked attendees if they had seen these graphics. Fifty-four percent of respondents were sure they have seen the core learning outcomes graphics.

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[7] Poll 1: 2 questions; Poll 2: 1 question; Poll 3: 2 questions; Poll 4: 2 questions; Poll 5: 3 questions; Poll 6: 1 question; Poll 7: 3 questions.
[8] Poll questions can be found in Appendix G.

Section VI: Conclusion

A total of 4,603 NOVA students participated in the assessment of critical thinking, across six campuses and all modalities of teaching during the 2017-2018 college-wide critical thinking assessment. Of those students assessed, 93 percent exceeded, met, or partially met the target goal. When breaking-out the data by program and discipline, the numbers continue to be notable. Thirty-six programs and seven disciplines submitted critical thinking assessments in 2017-2018. Additionally, 72 percent of disciplines and programs met their target goals.

Approximately 83 percent of programs and disciplines used their previously established student learning outcomes when assessing critical thinking. This means, though this is the first year NOVA assessed critical thinking using course embedded assessment, individual programs and disciplines have been assessing it, via their SLOs for some time. Additionally, 93 percent of programs' and disciplines' assessment methods clearly align with the VCCS definition of critical thinking.[9]

Based on 2017-2018 results, disciplines and programs indicated 267 actions to improve students' critical thinking skills and/or the assessment process. These action plans point to a culture of assessment that focuses on continuous improvement. At NOVA, the phrase "no changes need to be made at this time," is strongly discouraged. The content and determining factors of a "quality education" are moving targets, which means the process of education must also continually seek improvement and change.

To provide a greater perspective on core learning outcomes assessment and education at NOVA, the 36 faculty and academic administrators (e.g., deans and provosts) participating in Critical Thinking Working Group provided suggestions to improve: the assessment process; types of workshops they would like to be offered; how we provide information about core learning to students and the public; and student learning.

The culture of assessment at NOVA is well established and grows stronger each year as faculty and staff more regularly participate in the process of assessment, and provosts, deans, directors, discipline Chairs, and SLO Leads spread a culture of assessment at every level.

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[9] Appendix I provides a list of sample assignments to assess critical thinking.

Appendix A: Raw Number Data Tables

Table A. Submission Rate of Annual Planning and Evaluation Reports Assessing Critical Thinking for Assessment Year 2017-2018

	Core Learning Outcome: Critical Thinking
Program	36
Discipline	7
Overall	**43**

Table B. Number of Programs and Disciplines Using Student Learning Outcomes for Critical Thinking Assessment

	# Using SLOs	Percentage
Program (37)	32	88.9
Discipline (6)	4	57.1
Overall (43)	**36**	**83.7**

Table C. Critical Thinking Sample Sizes by Course Level

	100-Level	200-Level
Programs	821	694
Disciplines	2316	772
Programs and Disciplines	3137	1466

Table D. Number of Courses Assessed and Average Sample Size by Course Level

	Number of Courses Assessed		Average Sample Size	
	100-Level	200-Level	100-Level	200-Level
Programs	13	22	196	33
Disciplines	3	4	1158	257
Programs and Disciplines	16	26	325	61

Table E. Effectivity of Rubrics and Exams by Discipline Group

	Rubrics				Exams			
	Assignment-Specific		Generic		Outcome-Specific		Generic	
	#	%	#	%	#	%	#	%
Program	10	83.3	11	84.6	8	100	1	25.0
Discipline	2	16.7	2	15.4	0	0.0	3	75.0
Programs and Disciplines	12	100	13	100	8	100	4	100

Table F. Critical Thinking Code Utilization by Educational Units

	Programs		Disciplines		Programs and Disciplines	
	#	%	#	%	#	%
Explanation/Identification of Issues	28	23.7	2	5.7	30	19.6
Identification of Concepts	1	0.8	14	40.0	15	9.8
Evidence Utilization	10	8.5	3	8.6	13	8.5
Context/Stakeholder Recognition	15	12.7	2	5.7	17	11.1
Problem Solving	5	4.2	1	2.9	6	3.9
Perspective/Position	9	7.6	1	2.9	6	6.5
Analysis	35	29.7	6	17.1	41	26.8
Creative/Innovative Thinking	12	10.2	3	8.6	15	9.8
Other	3	2.5	3	8.6	6	3.9
Total	**118**	**100**	**35**	**100**	**153**	**100**

Table G. Critical Thinking Utilization by Assessment Method

	Rubrics		Exams		Rubrics and Exams	
	#	%	#	%	#	%
Explanation/Identification of Issues	18	16.4	12	29.3	30	19.9
Identification of Concepts	15	13.6	0	0.0	15	9.9
Evidence Utilization	12	10.9	1	2.4	13	8.6
Context/Stakeholder Recognition	12	10.9	5	12.2	17	11.3
Problem Solving	3	2.7	3	7.3	6	4.0
Perspective/Position	10	9.1	0	0.0	10	6.6
Analysis	25	22.7	14	34.1	39	25.8
Creative/Innovative Thinking	12	10.9	3	7.3	15	9.9
Other	3	2.7	3	7.3	6	4.0
Total	**110**	**100**	**41**	**100**	**151**	**100**

Table H. Critical Thinking Target Achievement by Programs and Disciplines: All Level Courses

	Programs		Disciplines		Overall	
	#	%	#	%	#	%
Exceeded	13	36.1	1	14.3	14	32.6
Met	13	36.1	3	42.9	16	37.2
Partially Met	4	11.1	2	28.6	6	13.9
Did Not Meet	6	16.7	1	14.3	7	16.3
Total	**36**	**100**	**7**	**100**	**43**	**100**

Note: Liberal Arts, General Studies, and Social Sciences are multidiscipline and were counted as one report (rather than three individual reports). Student Development, assessed under the multidiscipline, was also counted as assessing CT separately.

Table I. Critical Thinking Target Achievement by Programs and Disciplines: 100-Level and 200-Level Courses

	100-Level Courses						200-Level courses					
	Programs		Disciplines		Overall		Programs		Disciplines		Overall	
	#	%	#	%	#	%	#	%	#	%	#	%
Exceeded	7	53.8	1	33.3	8	50.0	5	21.7	0	0.0	6	22.2
Met	2	15.4	0	0.0	2	12.5	12	52.2	2	50.1	14	51.9
Partially Met	3	23.1	1	33.3	4	25.0	1	4.3	1	25.0	1	3.7
Did Not Meet	1	7.7	1	33.3	2	12.5	5	21.7	1	25.0	6	22.2
Total	**13**	**100**	**3**	**100**	**16**	**100**	**23**	**100**	**4**	**100**	**27**	**100**

Note: Liberal Arts, General Studies, and Social Sciences are multidiscipline and were counted as one report (rather than three individual reports). Student Development, assessed under the multidiscipline, was also counted as assessing CT separately.

Table J. Critical Thinking Target Achievement by Sample Size: All Level Courses

	Number of Students	
	#	%
Exceeded	827	17.9
Met	1633	35.3
Partially Met	1819	39.8
Did Not Meet	324	7.0
Total	**4603**	**100**

Note: Accounting and History (Discipline) are not included in this table since they did not provide a sample size. Student Development (SDV) is counted only once as part of the multidiscipline report (under Disciplines).

Table K. Critical Thinking Target Achievement by Sample Size: 100-Level and 200-Level Courses

	100-Level Courses						200-Level courses					
	Programs		Disciplines		Overall		Programs		Disciplines		Overall	
	#	%	#	%	#	%	#	%	#	%	#	%
Exceeded	190	23.5	572	24.7	762	24.4	52	7.5	0	0.0	52	3.5
Met	567	70.2	0	0.0	567	18.1	341	49.1	725	93.9	1066	72.7
Partially Met	28	3.5	1744	75.3	1772	56.7	0.0	0.0	47	6.1	47	3.2
Did Not Meet	23	2.8	ND**	0.0	23	0.7	301	43.4	ND**	0.0	301	20.5
Total	**808**	**100**	**2316**	**100**	**3124**	**100**	**694**	**100**	**772**	**100**	**1466**	**100**

Table L. Average Number of "Use of Results" per Discipline Group: 2017-2018

	Annual Reports Submitted	Total # of Use of Results	Average # of Use of Results
Program	36	215	5.9
Discipline	7	52	7.4
Program and Discipline	43	267	6.2

Table M. Descriptions and Examples of Changes by Major Categories and Subcategories

Subcategory	Description and Examples
Curriculum Specific	
Curricular Change	Curricular change to degree program, e.g., added a course or other requirement; changed sequence of courses, paradigm shift—i.e., change in program focus based on industry standards and evolving technology; change in time schedule (when classes are offered); added courses on-line or in hybrid format; added/increased number of sections of a course to accommodate more students; coordinated course scheduling with other campuses, designing a common course syllabus, competitive admission, designing a common course curriculum
Course Revision	Revised existing course or courses; added or revised assignment, tests, readings, projects; modified assignment; modified course content, changed textbook; added or modified study guides, checklists, or other course handouts; revisited course topics for greater comprehension; emphasized/improved content; posted material online; added rubric; added review session or practice test; revised time spent on topic, remediation
Pedagogy	Revised methodology of delivering course material, e.g., less lecture, more student involvement, more interactive or experiential activities (lab) ; integrated learning technology (video, Blackboard), smaller class size, added or replaced some in person courses with on-line or hybrid courses (differs from offering entire degree program on-line); added peer learning methods
Pre-requisites	Changed entrance requirements to program, e.g., require completion of MTH 151 or ENG 111 before entering program; changed GPA requirement; requirement of computer competency test before program placed
Subject Matter Expert Feedback	Sought recommendations from external and internal stakeholders, e.g., employers, on-site clinical coordinator/supervisor, program advisory board/committee, accreditation body, faculty cluster
Program Resources	
Financial	Requested additional fiscal resources; allocated funds from other budget area to focus on achieving SLO

Human Resources	Provided faculty or adjuncts with development or training, e.g., faculty attend teaching workshops or conference to keep current with industry changes; hired new faculty
General Resources	Utilized external partners as guest speakers or resources for students; physical resources, e.g., new software, computers, open lab time, expansion of physical space
Co-curricular Resources	
Co-Curricular Opportunities	Coordinated opportunities to engage in learning outside classroom: e.g., faculty and student interaction outside classroom; optional field trips; internships (if not a part of course) social gatherings, career fairs, speakers, study sessions, participation in professional or student organizations
Academic Support/ Advising	Connected students with peer tutors; referred to NOVA Academic Support Resources like Writing Center, Science Lab, Math Lab; referred student to see academic advisor, counselor; improved or increased faculty advising and guiding students on degree related topics; program placement, transfer info sessions for 4 year colleges
SLO Assessment Process	
SLO Assessment Change	Changed or added to the assessment method for the SLO; broke out SLO components and assessed those individually
Data Analysis Method Change	Changed or modified data analysis method, e.g., developed a new rubric; added indirect measures such as surveys or student self-assessment
Student Learning Outcome Change	Refined or modified student learning outcome(s)
Target Increased	Increased target for success, e.g., increased the target number of students achieving a certain score on an assessment from 70% to 80%; increased the target assessment score from 60% to 70%
Target Decreased	Decreased target, e.g., decreased the target number of students achieving a certain score on an assessment from 90% to 80%; decreased the target assessment score from 100% to 90%
Target Clarified	Target was created/determined; target was revised or modified to be more clear or specific
Sample Size	Improved/increased sample size, e.g., assessed more sections of a course; assessed more courses for the same SLO; increased faculty/campus participation in assessment
Communication on Assessment Process	Communicated with faculty to clarify or revise the assessment process
College-Level	
Dual Enrollment	Allowed students to take program courses during high school
Articulation Agreement	Increased number of transferrable credits to specific 4-year institutions; Agreement with 4-year institutions to accept NOVA graduates
Recruitment/Marketing	Efforts to increase access, e.g., outreach to high schools, non-traditional students, non-declared students
Other	
Other	Please specify

Table N. Actions to Improve Students' Critical Thinking Skills and the Assessment Process: 2017-2018

	"Use of Results" Major Categories											
	Curriculum-Specific		Program Resources		Co-Curricular Resources		Assessment Process		College-Level		Total	
	#	%	#	%	#	%	#	%	#	%	#	%

Program	118	54.9	9	4.2	15	6.9	51	23.7	22	10.2	215	100
Discipline	10	19.2	5	9.6	0	0	37	71.2	0	0	52	100
Program & Discipline	128	47.9	14	5.2	15	5.6	88	32.9	22	8.3	267	100

Table O. Actions to Improve Students' Critical Thinking Skills and the Assessment Process by Subcategory in Descending Order: 2017-2018

Subcategory	Number of Changes	% of Total
Course Revision	72	27.0
Data Analysis Method	28	10.5
Pedagogy	28	10.5
CLO Assessment Change	24	9.0
Communication	22	8.2
Curricular Change	19	7.1
Academic Support/Advising	15	5.6
Recruitment/Marketing	15	5.6
Human Resources	12	4.5
Subject Matter Expert Feedback	9	3.4
Sample Size	7	2.6
Dual Enrollment	5	1.9
Core Learning Outcome	4	1.5
Target Increased	3	1.1
Articulation Agreement	2	0.7
Financial	1	0.4
General Resources	1	0.4
Pre-Requisites	0	0.0
Co-Curricular	0	0.0
Target Decreased	0	0.0
Target Clarified	0	0.0
Other	0	0.0
Total	**267**	**100**

Table P. Actions to Improve Students' Critical Thinking Skills and the Assessment Process by Subcategory: Curriculum-Specific

Use of Results Sub- Category: Curriculum-Specific Critical Thinking [2017-2018]										
	Curricular Change		Course Revision		Pedagogy		Pre-Requisites		Subject-Matter Expert Feedback (SMEF)	
	#	%	#	%	#	%	#	%	#	%
Program	19	100	64	88.9	28	100	0	0	7	77.8
Discipline	0	0	8	11.1	0	0	0	0	2	22.2
Program & Discipline	19	100	72	100	28	100	0	0	9	100

Table Q. Actions to Improve Students' Critical Thinking Skills and the Assessment Process by Subcategory: Program Resources

Use of Results Sub- Category: Program Resources Critical Thinking [2017-2018]						
	Financial		Human Resources		General Resources	
	#	%	#	%	#	%

	#	%	#	%	#	%
Program	0	0	8	66.7	1	100
Discipline	1	100	4	33.3	0	0
Program & Discipline	1	100	12	100	1	100

Table R. Actions to Improve Students' Critical Thinking Skills and the Assessment Process by Subcategory: Co-Curricular Resources

Use of Results Sub- Category: Co-Curricular Resources Critical Thinking [2017-2018]				
	Co-Curricular Opportunities		Academic Support/Advising	
	#	%	#	%
Program	0	0	15	100
Discipline	0	0	0	0
Program & Discipline	0	0	15	100

Table S. Actions to Improve Students' Critical Thinking Skills and the Assessment Process by Subcategory: Assessment Process

Use of Results Sub- Category: Assessment Process Critical Thinking [2017-2018]																
	CLO Assessment Change		Data Analysis Method Change		Communication		CLO Change		Target Increased		Target Decreased		Target Clarified		Sample Size	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Program	11	45.8	23	82.1	11	50	2	50	1	33.3	0	0	0	0	3	42.9
Discipline	13	54.2	5	17.9	11	50	2	50	2	66.7	0	0	0	0	4	57.1
Program & Discipline	24	100	28	100	22	100	4	100	3	100	0	0	0	0	7	100

Table T. Actions to Improve Students' Critical Thinking Skills and the Assessment Process Subcategory: College-Level

Use of Results Sub- Category: College-Level Critical Thinking [2017-2018]						
	Dual Enrollment		Articulation Agreement		Recruiting/ Marketing	
	#	%	#	%	#	%
Program	5	100	2	100	15	100
Discipline	0	0	0	0	0	0
Program & Discipline	5	100	2	100	15	100

Appendix B: 2017-18 Operationalized Definitions of Critical Thinking

Table A. Critical Thinking Operationalized Definitions by Programs

Program Name	Course Level	Operationalization
Fine Arts, A.A./A.A.A.	100	Students were given a formal writing assignment (topics could vary as long as they were selected from ART 100 course content area) and tasked with producing a well-organized piece of formal art criticism.
General Studies, A.S.	100	**SDV 100:** Identify three to five aspects of Critical Thinking such as: identifying faulty logic, problem-solving, and asking questions/probing etc.
Horticulture Technology, A.A.S.	100	Gardens and culture research paper. This project was assigned as a semester long research paper allowing students to critically think about the course material and have an opportunity to research and explore in depth a garden history topic related to a specific culture and period in history.
Liberal Arts, A.A.	100	**SDV 100:** Identify three to five aspects of Critical Thinking such as: identifying faulty logic, problem-solving, and asking questions/probing etc.
Music, A.A., A.A.A., and A.A.A. Jazz/Popular Music Specialization	100	Students will be able to effectively research and write on topics in the area of music / jazz and popular music.
Music Recording Technology Certificate	100	Explain issues in copyright law. For this class, issues that arise with regard to infringement by sampling OR music piracy, problems and possible solutions.
Paralegal Studies, A.A.S.	100	Draft legal documents including but not limited to pleadings, contracts, wills, and deeds.
Professional Writing Certificate	100	Writing a business report with the following attributes: • Attribute 1: Explanation of issues • Attribute 2: Evidence • Attribute 3: Influence of context and assumptions • Attribute 4: Students' perspective or thesis • Attribute 5: Conclusions
Public History & Historic Preservation Career Studies Certificate	100	Students will learn the use and utility of diverse archive document types and their purpose. Students will attempt to use information from these sources to investigate historic topics.
Radiography, A.A.S.	100	Apply knowledge of anatomy and positioning, and radiographic techniques to accurately image anatomical structures.
Social Sciences, A.S.	100	**SDV 100:** Identify three to five aspects of Critical Thinking such as: identifying faulty logic, problem-solving, and asking questions/probing etc.
Substance Abuse Rehabilitation Counselor, Certificate	100	Students will be able to scientific facts of disease and the effects of psychoactive drugs on the central nervous system.
Veterinary Technology, A.A.S.	100	Explain animal patient assessment, nursing procedures, and the implantation of prescribed diagnostics and treatments, including basic animal care or husbandry.
Welding: Basic Techniques Career Studies Certificate	100	Apply basic machine and technique adjustments to solve typical welding problems.

Program		Outcome
Accounting, A.A.S.	200	Describe and make distinctions between various accounting methods under U.S. GAAP and international financial reporting standards (IFRS).
Administration of Justice, A.A.S.	200	The CT proficiencies identified for the paper were: Students will demonstrate the ability to: 2.1 discriminate among degrees of credibility, accuracy, and reliability of inferences drawn from given data 2.2 recognize parallels, assumptions or presuppositions in any given source of information 2.3 evaluate the strengths and relevance of arguments on a particular question or issue 2.4 weigh evidence and decide if generalizations or conclusions based on the given data are warranted
ASL to English Interpretation, A.A.S.	200	Students will demonstrate the ability to analyze their own interpreting product, identify strengths and at least 2 areas of improvement that will have the greatest impact on their product, and determine a plan for practice outside of the classroom.
Architecture Technology, A.A.S.	200	Students will be able to describe how buildings are constructed.
Automotive Technology, A.A.S. and Emissions Specialization	200	Apply electrical theory using wiring diagrams and schematics to diagnose and repair automotive electrical circuits.
Biotechnology, A.A.S.	200	Apply the scientific method including: planning an experiment, collecting data, analyzing and interpreting data.
Computer Science, A.S.	200	Demonstrate Critical Thinking by applying appropriate data structures and Abstract Data Types (ADTs).
Cybersecurity, A.A.S.	200	Describe current threats and explain how to continuously monitor the threats that may be present in the cyber realm (1, 2, 5, 6).
Diagnostic Medical Sonography, A.A.S.	200	Integrate patient history, current medical condition, and sonographic findings to provide accurate diagnostic information.
Drivers Education Career Studies Certificate	200	Students will be able to design a proper behind the wheel driving route.
Early Childhood Development, A.A.S.	200	Students provide self-analysis and reflection on the Program Capstone Project.
Fine Arts: A.A.A., Photography Specialization	200	Students were given a formal writing assignment (topics could vary as long as they were selected from ART 100 course content area) and tasked with producing an Artist Statement.
Health Information Management, A.A.S.	200	Apply policies and procedures surrounding issues of access and disclosure of protect health information. (II.C)
Hospitality Management, A.A.S.	200	Students will describe and apply the four functions of management: plan, organize, lead and control.
Liberal Arts: English Specialization, A.A.	200	The ENG Discipline Group selected 1 of our existing Student Learning Outcomes (SLO): Student analyzes written, oral, and visual texts.
Medical Laboratory Technology, A.A.S.	200	Cell identification and disease correlations.
Nursing, A.A.S.	200	Program SLO #8: Demonstrate the use of Critical Thinking throughout the nursing process in the provision of client care.

Occupational Therapy Assistant, A.A.S.	200	Apply reflective problem-solving skills and decision-making skills while providing OT intervention in a safe manner.
Photography and Media, A.A.S.	200	Writing a statement should clarify the conceptual intent of the student's work and help them identify and be aware of their creative process.
Physical Therapy Assistant, A.A.S.	200	Present sound rationales for clinical problem solving within the plan of care established by the physical therapist.
Geographic Information Systems Career Studies Certificate Social Science: Geospatial Specialization, A.S.	200	Students will articulate a complex problem and associated steps to solve based on assessment of project proposal.
Social Sciences: Teacher Education Specialization, A.S.	200	Students compose a 2-3-page philosophy of education. In their philosophies, they must synthesize information from class, the instructional materials, and their field experiences.
Dental Assisting Program, Certificate	Not Specified	Understand and demonstrate knowledge of radiation safety measures in order to produce diagnostic radiographic surveys.
Personal Training Career Studies Certificate	Not Specified	Students will identify modifiable risk factors contributing to Cardiovascular disease.
Phlebotomy Career Studies Certificate	N/A; Graduate's PBT Certification Test	Exam section on Laboratory Operations requires the utilization of Critical Thinking skills to evaluate laboratory data to determine accuracy of generated data and for detection of systematic error in laboratory instruments. Other questions include situations to determine course of action needed to reduce risks for infections, accidental needle sticks and practices needed to maintain the safety in laboratory environment.

Table B. Critical Thinking Operationalized Definitions by Disciplines

Discipline Name	Course Level	Operationalization
Biology	100	SLO #2: Students will understand the scientific method and identify methods of inquiry that lead to scientific knowledge.
Student Development	100	SDV 100: Identify three to five aspects of Critical Thinking such as: identifying faulty logic, problem-solving, and asking questions/probing etc.
History	100	SLO 2: Evaluate primary and/or secondary documents for their credibility and/or use in explaining the past.
Economics	200	Respond to multiple choice exams on micro and macroeconomics.
Physics	200	Specifically, for the physics learning outcome, students will be able to use mathematical reasoning to draw logical conclusions and make well-reasoned decisions.
Sociology	200	We asked students to read a short article and then answer 10 multiple choice questions about the article.

Appendix C: Codes for Target Data

Table A. Target Codes

Category	Description
Operationalization (O)	Program/discipline provided an operationalized definition of the CLO that was clear and measurable; includes actions students will take to learn this outcome (e.g., demonstrate proficiency in, analyze data, interpret information, etc.)
Sample Size	*SSS – Small Sample Size* Samples with 33 students or under.
	MSS – Medium Sample Size Samples between 34 and 69 students.
	LSS – Large Sample Size Samples over 70 students.
Outcome-Method Match (OMM)	Method/assignment the program/discipline used effectively measures the operationalized CLO.
Rubric/Measure	*Rubric in APER (R)* Separate Rubric/assessment measure and/or grading scale was not provided but was explained in the *APER*.
	No Rubric Provided (NRP) No rubric was provided either with the *APER* submission email or in the *APER*.
	Assignment-Specific Rubric (ASR) Rubric primarily evaluates the CLO being assessed and one or both of the following aspects: 1. Clear description of grading criteria/grading scale is provided 2. Provides purpose of assignment
	Generic Rubric (GR): Does not evaluate the CLO being assessed, is vague/not clear, grading scale not provided, no purpose presented.
Examination	*Outcome-Specific Examination (OS):* The exam questions evaluate the assessed CLO by addressing 3 or more aspects of the CLO.
	Generic Examination (OFF): The exam questions do not fully evaluate the assessed CLO. Only assessed 2 or less of the concepts and/or is vague/unclear.
Target	*Criteria Target (CTA)* Target was met in 75% of the criteria, but not overall.
	Overall Target (OT) Target was met overall.
Other (OTH)	

Appendix D: Music Recording Technology Rubric

NOVA Critical Thinking Rubric*
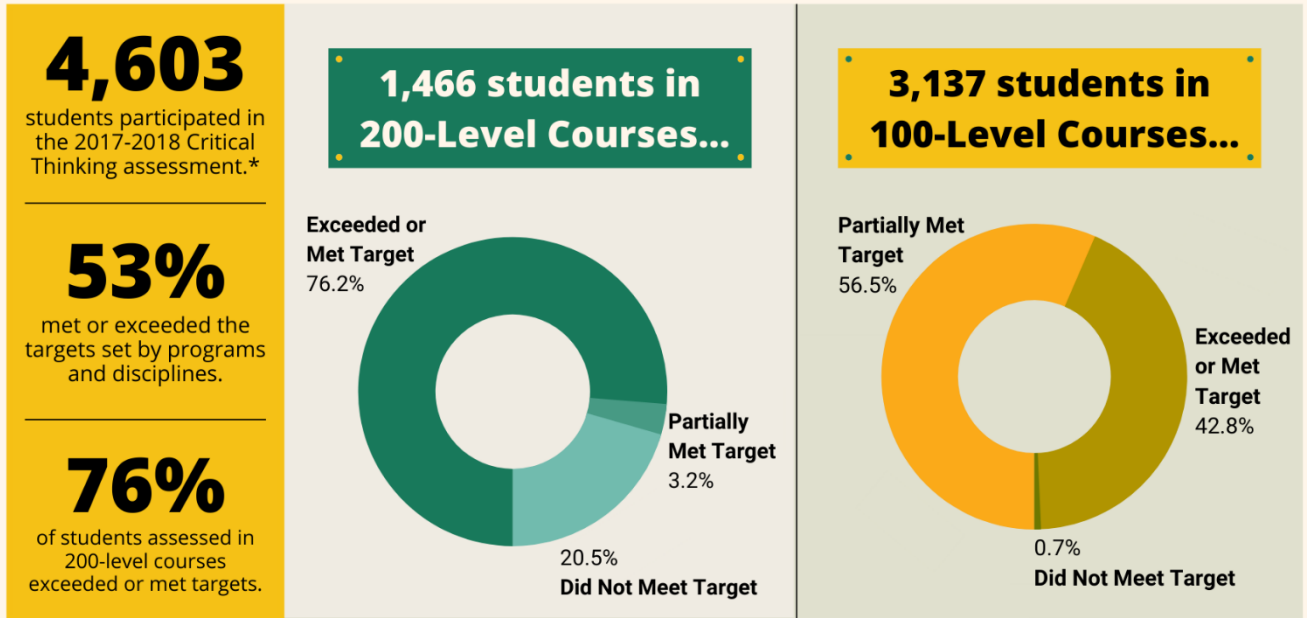
Quality Criteria	High Proficiency (4 points)	Proficiency (3 points)	Some Proficiency (2 points)	No/Limited Proficiency (1 point)	Rating (1,2,3,4 pts)
1. Identifies and explains **ISSUES**	Clearly identifies, summarizes, and explains main issues and identifies embedded or implicit issues, addressing their relationships to each other.	Identifies, summarizes, and briefly explains the main issues, but fails to mention any implicit issues.	Identifies main issues but does not summarize or explain them clearly or sufficiently.	Fails to identify, summarize, or explain the main issue. (AND/OR) Represents the issues inaccurately or inappropriately.	
2. Recognizes stakeholders and **CONTEXTS** (i.e., cultural/social, educational, technological, political, scientific, economic, ethical, personal experience)	Correctly identifies the empirical and theoretical contexts relevant to the main stakeholders, and identifies minor stakeholders and contexts showing the tensions or conflicts of interest among them.	Correctly identifies the empirical and most theoretical contexts relevant to the main stakeholders.	Shows some general understanding of the influences of empirical and theoretical contexts on stakeholders but does not identify any specific ones.	Fails to accurately identify and explain any empirical or theoretical contexts for the issues. (OR) Presents problems as having no connections to other conditions or contexts.	
3. Frames personal responses and acknowledges other **PERSPECTIVES**	Formulates a clear personal point of view and addresses relevant perspectives successfully.	Formulates a clear personal point of view and considers some other perspectives.	Formulates a vague personal point of view and/or vague alternative points of view.	Fails to formulate a personal point of view and fails to consider other perspectives.	
4. Identifies and evaluates **ASSUMPTIONS**	Identifies and carefully evaluates the important assumptions.	Identifies and briefly evaluates the important assumptions.	Identifies some of the most important assumptions but does not evaluate them for plausibility or clarity.	Fails to identify and evaluate any of the important assumptions behind the claims and recommendations made.	
5. Identifies and evaluates **EVIDENCE**	Correctly identifies and rigorously evaluates important evidence, successfully linking the evidence to theoretical concepts and frameworks while providing new or alternative data or information for consideration.	Correctly identifies important evidence, highlights its relative importance, and makes an attempt at linking evidence to theoretical concepts and frameworks.	Correctly identifies data and information that counts as evidence but fails to highlight its relative importance and/or link them with theoretical concepts and frameworks.	Fails to correctly identify data and information that counts as evidence for truth-claims (AND/OR) fails to evaluate its credibility.	

Quality Criteria	High Proficiency (4 points)	Proficiency (3 points)	Some Proficiency (2 points)	No/Limited Proficiency (1 point)	Rating (1,2,3,4 pts)
6. Identifies and evaluates **IMPLICATIONS** (*"What does this mean?"*)	Identifies and thoroughly evaluates implications, conclusions, or consequences of the issue.	Identifies and briefly evaluates many implications, conclusions, or consequences of the issue.	Suggests some implications, conclusions, or consequences of the issue.	Fails to identify implications, conclusions, or consequences of the issue.	

* Developed by Northeastern Illinois University, last revised on 10/23/06.

Appendix E: 2017-2018 Critical Thinking Achievement on Targets Infographic

TARGETING *CRITICAL THINKING* AT NOVA

4,603 students participated in the 2017-2018 Critical Thinking assessment.*

53% met or exceeded the targets set by programs and disciplines.

76% of students assessed in 200-level courses exceeded or met targets.

1,466 students in 200-Level Courses...

Exceeded or Met Target 76.2%

Partially Met Target 3.2%

20.5% Did Not Meet Target

3,137 students in 100-Level Courses...

Partially Met Target 56.5%

Exceeded or Met Target 42.8%

0.7% Did Not Meet Target

Samples of Critical Thinking Outcomes

200-Level Courses

"Students will apply electrical theory using wiring diagrams and schematics to diagnose and repair automotive electrical circuits."
- *Automotive Technology, A.A.S.*

"Students will demonstrate critical thinking by applying appropriate data structures and Abstract Data Types (ADTs)."
- *Computer Science, A.S.*

100-Level Courses

"Students will apply knowledge of anatomy and positioning, and radiographic techniques to accurately image anatomical structures."
- *Radiography, A.A.S.*

"Students will evaluate primary and/or secondary documents for their credibility and/or use in explaining the past."
- *History Discipline*

Office of Institutional Effectiveness and Student Success
*Data retrieved from Institutional Effectiveness Audit of Critical Thinking: 2017-2018

Pictures retrieved from Freepik.com

Appendix F: Programs and Disciplines Represented at the Working Group

Pathway	Program/Discipline
Business and Hospitality Management	Economics
Education and Public Service	Drivers Education
	Early Childhood Development
Engineering and Applied Technology	
General Studies, General Education, Global Studies	Health Sciences
Health Sciences	Diagnostic Medical Sonography
	Health Information Management
	Medical Laboratory Technology
	Personal Training
Information and Engineering Technology	Cybersecurity
Languages	Provost
	Dean
	ASL to INT
	English
Life Sciences	Provost
	Dean
	Biotechnology
Liberal Arts and Communication	Communication
Mathematics and Computer Science	Dean
	Computer Science
Nursing and Surgical Technologies	
Social Sciences	History
	Geospatial
Physical Sciences	Chemistry
Visual, Performing, and Media Arts	Music Recording Technology

Appendix G: Critical Thinking Working Group Meeting Polling Questions

Poll 1: Assessing Critical Thinking
1. In the 2017-2018 assessment year, did you use an existing SLO?
2. For the 2020-2021 assessment year, are you assessing Critical Thinking or Quantitative Literacy?[10]

Poll 2: Assessment Participation
1. While the numbers are great, many leads indicated they had difficulty to participate. Did you have difficulty getting faculty to participate?

Poll 3: Meeting Targets
1. Did it [target results] reflect students' Critical Thinking ability?
2. Do you think your assessment of Critical Thinking was rigorous in 2017-2018?

Poll 4: Critical Thinking Categories
1. Are there any categories you feel are not necessary?
2. Would you like a set of criteria you could use as appropriate to your assignments or exams?

Poll 5: Actions to Improve Students' Critical Thinking Skills
1. After seeing the three areas NOVA's assessment touches upon, where do you think your program/discipline is at for the current assessment year (2020-2021)?
2. Compared to 2017-2018, which level are you in?
   "In 2017-18, my program/discipline was in the _____ level, but in 2020-21, my program/discipline is in the ___ level."
3. Where do you think your changes need to focus as a whole?

Poll 6: Awareness of Infographic
1. Have you seen any of the Core Learning Outcomes infographics?

Poll 7: Working Group Recommendations
1. Should NOVA be asking innovative assessments and ideas?
2. Should NOVA create a College-wide target goal? Of 70%?
3. Should target goals be comparable across similar programs/disciplines?

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[10] This question was directed primarily at faculty, however, deans and provosts answered this question as well.

Appendix H. Critical Thinking Working Group Feedback Survey

1. Do you think the CT working group was helpful to understanding NOVA's assessment process and impact of CT assessment results? What was most useful? What was least useful?

2. Did we discuss the topics you expected? If not, what topics should we consider including next time?

3. Are there any steps in the assessment process where you feel you need more support from the Office of Academic Assessment?

4. The Office of Academic Assessment is currently creating a Canvas Page as a resource for faculty, deans, and provosts for all areas in student learning assessment (SLO, CLO, and Program Review). Do you expect you and your faculty would use it?

5. Would you be willing to participate in a regular CT working group (at the most one meeting per semester) to prepare for and provide feedback on the upcoming Spring 2021 CT assessment? If so, please include your name of send Linda Baughman a separate email.

6. Please use the space below to write additional comments.

Appendix I. Critical Thinking Assignment Recommendations

When analyzing program and discipline assessment methods, the Office of Academic Assessment found that some assessment methods allowed for a well-rounded assessment of critical thinking. Meaning, they assess almost all critical thinking criteria (Table 5). A list of sample assessment methods for critical thinking follows:

- Scenario Question: provide students with 1-3 scenarios along with questions that include elements such as issue identification, problem solving, or analysis. See Table 5 for more categories of critical thinking.
- Research Paper: have students research an issue relating to an overarching theme/topic in the course. In addition, have students explore alternative solutions. See Appendix D for the NOVA Critical Thinking Rubric.
- Reflection Writing Assignment: have students reflect on a major project (individual or group) by explaining their own strengths and areas needing improvement, an alternative methodology, and future directions. Reflection assignments should include examples and an analysis of how a new methodology might have changed the outcome of the project.
- Test/Exam Questions: include a mix of multiple choice, identification, and open-ended questions to provide the most accurate assessment of critical thinking.

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

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Community College

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