UNC Asheville has identified two student learning outcomes and two operational outcomes for the QEP to be assessed through multiple direct and indirect measures. A complete assessment plan, including outcomes, measures, proposed timeline, and name of persons responsible, is located in appendix __. Data collected from the assessments will be used to provide improvements both to critical thinking training and to the *Inquiry ARC* experience in order to further enhance students' critical thinking skills. Additionally, the data will guide the plan's implementation in years 3-5.

Student Learning Outcomes

The original QEP document includes the following two student learning outcomes.

SLO 1: Inquiry ARC SLO - The critical thinker will 1) demonstrate an ability to engage in comprehensive exploration of issues, ideas, artifacts, or events; 2) explain the evidential, conceptual, methodological, or contextual basis for the project; and 3) complete the project in a way that cultivates valuable intellectual traits such as intellectual courage, intellectual empathy, and intellectual humility.

SLO 2: Disposition SLO - The critical thinker will demonstrate a habit of mind that involves 1) cognitive maturity, 2) openness to new ideas, 3) inquisitiveness, 4) ability to anticipate potential consequences, 5) persistence in seeking truth, 6) systematic in research processes, and 7) confidence in reason.

We are revising these two student learning outcomes as follows.

SLO 1: Critical Thinking Skills – Students will demonstrate critical thinking skills in the processes they use to identify and solve problems.

SLO 2: Critical Thinking Dispositions – Students will demonstrate a positive disposition toward using critical thinking to form judgments about what to believe or what to do.

How did we get to here from there?

The original SLO 1 was an attempt to achieve two goals through one statement: to define critical thinking and to specify how it will be measured. The three subparts of SLO1 represent three sets of characteristics common to popular definitions of critical thinking (e.g., American Association of Colleges and Universities, the American Philosophical Association and the Paul-Elder model of critical thinking). The enumerated characteristics were selected because of their apparent alignment with *Inquiry ARC* learning processes.

Now that pilot group members are designing their *Inquiry ARC* experiences, we have concerns about the use of such specific terminology in this outcome. Pilot courses come from a wide variety of disciplines, and we fear that the original language places unanticipated and unnecessary constraints on the types of acceptable projects. Because our goal is to infuse our curriculum with *Inquiry ARC* experiences over time, it is important to state the outcome in a more general language that can encompass a wide variety of types of projects.

SLO 1 also delineated the specific critical thinking skills we would measure. The variety of types of projects in design by our pilot group suggests that use of a specific list was premature and places unnecessary constraints on project design. Finally, titling this as the "*Inquiry ARC SLO*" suggests that the only truly valid measures would be those used within *Inquiry ARC* courses. Redefining the outcome with a focus on critical thinking skills makes our other planned assessments—the Collegiate Learning Assessment, the National Survey of Student Engagement—more appropriate and valid. This expanded

assessment also will permit comparison of critical thinking skills among those who do and do not complete *Inquiry ARC* experiences.

Our revision of SLO 2 reflects the same concern with flexibility and inclusiveness. We have replaced the list of seven specific dispositions with two categories of dispositions: beliefs and actions.

The revised SLO still acknowledges that possessing skills does not guarantee that one will use them. It is vital that students develop the disposition to use those intellectual skills. In reviewing the APA definition of critical thinking in the Delphi report, it is clear that disposition is as important as skills. The definition includes words like "habitually inquisitive", "open-minded", "flexible", and "fair minded in evaluation". It concludes with the statement "Thus educating good critical thinkers […] combines development of critical thinking skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society" (Facione, 1990). Furthermore the AACU definition of critical thinking starts with the words "habit of mind" (Association of American Colleges and Universities, 2011) and the Paul-Elder model of critical thinking includes intellectual traits such as "fair mindedness", "perseverance", and "confidence in reasoning" (Paul and Elder, 1999).

Clearly, the disposition to think critically is viewed as important by critical thinking experts. While the first SLO measures skills and abilities, we also wanted to measure the "willing" side of "willing and able to think." Taken together, assessments of these two outcomes will provide a more comprehensive view, showing the likelihood of UNC Asheville students to think critically when they leave the university and enter the workforce.

Assessing Student Learning Outcomes

Critical Thinking Skills (SLO 1) will be assessed through two direct methods and two indirect methods. The direct assessments are a rubric applied to student projects in *Inquiry ARC* courses and student performance on the Collegiate Learning Assessment. The indirect assessments are student performance on the NSSE deep learning scale and its three relevant "scalelets" (higher order learning, integrative learning and reflective learning). Critical Thinking Dispositions (SLO 2) will be assessed through total score and subscale scores on the California Critical Thinking Dispositions Inventory. The significant changes from our original QEP document are the rubric to be used with student projects and the use of the Collegiate Learning Assessment as an additional direct measure of critical thinking skills.

SLO 1: Assessing Critical Thinking Skills by Rubric

All students who complete an Inquiry ARC course will produce a product. Our original plan was to use an existing rubric for evidence of critical thinking skills in that product. The assessment team first reviewed the AACU rubric for critical thinking. Developed by faculty from across the United States, it is intended for use in institutional-level assessment of undergraduate work and provides a framework for a national discussion on critical thinking. After the team looked more closely at the relationship between the Paul-Elder model and the *Inquiry ARC* learning process, it became clear that the AACU critical thinking rubric could not be used to assess the products of *Inquiry ARC* experiences -- the rubric simply does not assess all the components of these projects.

The team next examined a series of AACU rubrics and was able to identify among them a set of dimensions that do capture all *Inquiry ARC* components. Combining dimensions from several AACU rubrics allowed the team to create a unique rubric that dovetails directly with *Inquiry ARC* experiences. One advantage of the new rubric would be specific data on the success of each *Inquiry ARC* component; these data, therefore, will be used as a direct measure of students' critical thinking in the context of

Inquiry ARC experiences. A brief outline of that proposed rubric follows; see ==appendix ___== for the full rubric.

I-ARC component	Rubric	Dimensions
Inquire	AACU Inquiry and Analysis Rubric	Topic selection
		Existing Knowledge, Research, and/or Views
Apply	AACU Inquiry and Analysis Rubric	Design Process
		Analysis
		Conclusions
Reflect	AACU Lifelong Learning Rubric	Transfer
		Reflection
Communicate	AACU Civic Engagement Rubric	Civic Contexts/ Structures
		Civic Communication

Once again, unanticipated consequences have led us to revise our original plan. Members of the pilot group worked through an exercise using the rubric to evaluate mock student work and shared their thoughts its suitability. Inter-rater reliabilities across 40 rating pairs ranged from -.54 to .79 including 15 negative correlations, 9 correlations of 0 and 22 positive correlations, 87% of which were below .5. The consensus was that the composite rubric was not well suited to the task at hand.

The revised *Inquiry ARC* rubric requires educators to rate a series of statements as "clearly", "somewhat" or "not at all" describing the student. A list of the rubric statements follows; see ==appendix ___== for the full rubric.

1. Inquire
   a. The student clearly identifies an issue or concept to explore in a project.
   b. The student considers the significance of the chosen topic.
   c. The student comes to a clear and accurate understanding of the chosen topic.
   d. The student asks relevant and probing questions from multiple perspectives.
   e. The student gathers relevant information from a variety of sources (literature, experts, personal experiences).
2. Apply
   a. The student designed and implemented the project identified in Inquiry.
   b. The student uses well reasoned interpretation to identify assumptions and fallacies.
   c. The student applies ideas from other sources to their own thinking on the question or problem.
   d. The student connects the issue or concept to their own life and/or demonstrates a deeper understanding of the issue.
   e. The student is able to identify a conclusion.
   f. The conclusion is clearly identified and logical.
3. Reflect
   a. The student evaluates in writing what has been learned (about the topic) from the project.

b. The student evaluates in writing what has been learned (about self) from the project.
c. The student makes connections with prior learning.
d. The student applies prior learning in a new and creative way.
4. Communicate
a. The student successfully uses the conventions of the chosen method of communication.
b. The student communicates with a clear sense of purpose and is persuasive
c. The student communicates with sufficient breadth and depth as demanded by the project.
d. The student shows appropriate awareness of audience in their communication.

SLO 1: Assessing Critical Thinking Skills through the Collegiate Learning Assessment (CLA)

The *Collegiate Learning Assessment* (CLA) is a standardized written test used to measure students' critical thinking, analytic reasoning, written communication and problem solving skills. Students are randomly assigned to complete a Performance Task or an Analytic Writing Task. Written responses to the tasks are evaluated to assess the students' ability to think critically, reason analytically, solve problems, and write clearly and persuasively. The CLA provides an opportunity to compare performance of our students on a nationally normed test over a period of years and also provides opportunities to compare our students' performance to that of students at other similar colleges and universities.

SLO 1: Assessing Critical Thinking Skills through the National Survey of Student Engagement (NSSE)

The Deep Learning Scale of the NSSE, and its three component "scalelets", will be used to examine indirect measures of students' critical thinking skills. The Deep Learning Scale was created by three researchers from the Indiana University Center for Postsecondary Research who combined 12 items from the National Survey of Student Engagement (NSSE) which appeared to be related to deep learning. A series of factor analysis studies indicated that the items of the Deep Learning Scale clustered into three types of learning: Higher Order Learning, Integrative Learning, and Reflective Learning. The Deep Learning Scale and Subscales show good internal consistency and good relationships with other measures of deep learning (Lard, Shoup, & Kuh, 2005).

The NSSE Deep Learning Scale is includes all of the following items. The three Deep Learning scalelets include the following subsets of items:

1. Higher Order Learning Items
   a. Analyzed the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components;
   b. Synthesized and organized ideas, information, or experiences into new, more complex interpretations and relationships;
   c. Made judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions;
   d. Applied theories or concepts to practical problems or in new situations.
2. Integrative Learning items
   a. Worked on a paper or project that required integrating ideas or information from various sources;

      b. Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments;

      c. Put together ideas or concepts from different courses when completing assignments or during class discussions;

      d. Discussed ideas from readings or classes with faculty members outside of class;

      e. Discussed ideas from readings or classes with others outside of class (students, family members, co-workers, etc.)

3. Reflective Learning Items

      a. Examined the strengths and weaknesses of your own views on a topic or issue;

      b. Tried to better understand someone else's views by imagining how an issue looks from his or her perspective;

      c. Learned something that changed the way you understand an issue or concept.

Note: The team also is considering surveying senior students at a later date with some institutionally designed items about perceived growth in aspects of critical thinking. If we decide to proceed with this measure, we are likely to focus on dimensions such as the following.

1. Ability to clearly identify problems, questions, or issues;
2. Ability to collect and organize information;
3. Ability to consider the influence of context and assumptions;
4. Ability to draw logical conclusions;
5. Ability to analyze and evaluate ideas, texts, and arguments.

SLO 2: Assessing Critical Thinking Dispositions through the California Critical Thinking Disposition Inventory (CCTDI)

The QEP leadership team sought a standardized critical thinking assessment to apply in a long-term study of the effects of the University's pedagogies on students' critical thinking dispositions. After analyzing many critical thinking tests for their costs and the time needed to administer them, the ease of accessing test results, and their overall suitability for our model, it became clear that the best critical thinking test for our program was the California Critical Thinking Disposition Inventory (CCTDI) by Insight Assessment (http://www.insightassessment.com/). This test was designed to assess "personal attributes and attitudes of the ideal critical thinker" and was based on the Delphi Expert Consensus Definition of Critical Thinking (Facione & Facione, 2010).

The CCTDI aligns with the three definitions of critical thinking (APA, AACU, and Paul-Elder) that UNC Asheville used in developing its own definition of critical thinking. The test is administered online and the testing software allows our assessment team to download raw data files for analysis of CCTDI data in conjunction other student data.

The CCTDI generates a total score and a set of seven scale scores. Each scale score describes an element of the disposition toward using critical thinking to form judgments about what to believe or what to do. People may be positively, ambivalently, or negatively disposed on each of seven scales. All scales are equally weighted to derive the total score.

1. Truthseeking
2. Openmindedness
3. Analyticity

4. Systematicity
5. Critical Thinking Self-Confidence
6. Inquisitiveness
7. Maturity of Judgment

Several independent research studies have shown that the CCTDI is sensitive to changes in critical thinking dispositions, particularly in the context of problem-based learning models such as the *Inquiry ARC* model. Ozturk, Muslu, and Dicle (2008) compared senior nursing students in Turkey who were in problem-based learning (PBL) courses versus those in traditional lecture courses. Their results showed that there was a significant difference between the groups on overall disposition scores as well as truth-seeking and open-mindedness subscores. A longitudinal study of nursing students in Hong Kong (Tiwari, Lai, So, and Yuen, 2006) showed that, although students were not significantly different before entering the nursing program, those who took a two-semester problem-based learning course had a significantly higher increase in critical thinking disposition scores as well as truth-seeking, analytical, and confidence in reasoning subscores at the end of the year. The students took the same classes after the first year (i.e. neither group completed problem-based learning courses after the first year). At the end of the second year, the PBL group still had higher overall disposition scores and truth and analytical subscores. At the end of the four-year program, there were significant differences between the PBL group and the control group on truth-seeking and systematic subscores.

Similar results have been obtained from a sample of high school students in Israel. Barak, Ben-chaim, and Zoller (2007) compared high school science students exposed to intentional critical thinking pedagogies using real-world problems to control groups in science and non-science disciplines. Students were tested at the beginning of 10th grade (pre-intervention), at the end of the year (post-test), and at the end of 12th grade (post-post-test). Results showed that students exposed to intentional pedagogies had higher scores on the post-test and showed significantly more improvement on disposition scores as well as truth-seeking, open-mindedness, confidence in reasoning and judicious subscores. However, further improvement did not occur between the post-test and the post-post-test. Taken together, these studies show that the CCTDI is an appropriate assessment for the type of pedagogy we are introducing to UNC Asheville students.

Operational Goals

Determining the success of the Inquiry ARC experience requires an examination of the faculty development activities and subsequent course activities during the initial years of implementation. Course materials will be collected as part of the effort to evaluate the program. In no way will these data be used to evaluate individual faculty or departments.

To organize this evaluative process UNC Asheville has identified two operational goals and corresponding assessment methods. Results of these assessments will help determine if faculty development needs to be enhanced.

OG 1: Critical Thinking Pedagogy – Educators will improve their critical thinking pedagogy.

It was particularly important to the UNC Asheville community that critical thinking become institutionalized. It is our desire that the university culture will be heightened both in terms of our awareness and disposition of critical thinking as well as our abilities to apply critical thinking in various times of our lives.

OG 2: Critical Thinking Integration – *Critical thinking will become an integral part of UNC Asheville course based offerings.*

Assessing Operational Goals

The two operational goals will be assessed through a combination of indirect and direct measures.

OG 1: Assessing critical thinking pedagogy

A rubric (appendix __) has been designed to assess educator materials for evidence of use of critical thinking pedagogies and appropriate use of the *Inquiry ARC* experience. This rubric will evaluate syllabi and other instructional materials that educators leading *Inquiry ARC* courses will be required to submit. An *Inquiry ARC* survey has also been designed to get educator feedback on feelings of competence in teaching critical thinking skills.

OG 2: Assessing curricular integration

In order to assess the extent to which critical thinking has become an integral part of UNC Asheville course-based offerings, multiple measures of institutional data have been selected:

- number of workshops, learning circles, and other faculty development opportunities offered on campus that focus on critical thinking;
- attendance at workshops, learning circles, and other faculty development opportunities that focus on critical thinking;
- number of *Inquiry ARC* courses offered across departments;
- number of majors with critical thinking as a learning outcome;
- number of students taking one or more *Inquiry ARC* courses;
- number of educators teaching one or more *Inquiry ARC* courses.

Note: The team also is considering surveying faculty and students to see if they feel that critical thinking has become a priority for UNC Asheville. Educator questions would be included on the *Inquiry ARC* survey. Student questions would be added to an existing student survey (e.g., the graduating senior survey.

The Assessment Paradigm: Administration of Assessment Tools

Inquiry ARC Rubric

The projects students complete during *Inquiry ARC* experiences will be evaluated using the *Inquiry ARC*. These data will be stored in TracDat, our assessment management system, in order to make comparisons over time. For example, we will be able to assess whether students' scores on the rubric improve with their second and third experiences.

Collegiate Learning Assessment

The CLA is administered to freshmen and senior students every three years at UNC Asheville. The Office of Institutional Research oversees the administration and receives the score information from the publisher.

Deep Learning Scale

The NSSE is administered to freshmen and senior students every three years at UNC Asheville. The Office of Institutional Research will calculate student scores on the Deep Learning Scale from the NSSE data file.

California Critical Thinking Disposition Inventory

Each year UNC Asheville has approximately 900 incoming students. Approximately 600 are freshmen and 300 are transfers. In year one of the QEP (Gear-Up) incoming freshmen will complete the CCTDI to provide baseline information about critical thinking dispositions. In year two of the QEP (Roll-Out) graduating seniors will take the CCTDI, providing a baseline for the senior students' level of critical thinking disposition. In year three (Expand) the CCTDI will be administered to students who have not taken the test previously. This will provide additional baseline data on incoming freshmen and new baseline on incoming transfer students.

In years four and five, graduating seniors will take the CCTDI so that we can see the effects of *Inquiry ARC* projects over time. In particular we will be able to compare graduates with and without *Inquiry ARC* experiences and (by comparing senior data to data from incoming students) see the "value added" effects of *Inquiry ARC* experiences on critical thinking dispositions. Additionally, changed scores from freshman to senior year should reflect the number of *Inquiry ARC* courses taken.

Use of Results

The assessment team will be comprised of the Director of Institutional Effectiveness, the Director of Academic Assessment, the Director of Institutional Research, and selected faculty. This team will meet regularly to review and interpret assessment results and provide suggestions for improvement to the QEP Committee. Results of these discussions will be entered into TracDat.

We also plan to produce a quarterly newsletter to update the campus on the progress of the QEP, report assessment results, and highlight notable student projects.

The Revised Inquiry ARC Rubric

Inquiry ARC Rubric		Clearly describes student	Somewhat describes student	Does not describes student
Inquire	The student clearly identifies an issue or concept to explore in a project.			
	The student considers the significance of the chosen topic.			
	The student comes to a clear and accurate understanding of the chosen topic.			
	The student asks relevant and probing questions from multiple perspectives.			
	The student gathers relevant information from a variety of sources (e.g. literature, experts, individuals, personal experience).			
Apply	The student designed and implemented the project identified in Inquiry.			
	The student articulates a clear purpose for the project.			
	The student uses well reasoned interpretation to identify assumptions and fallacies.			
	The student is able to identify a conclusion.			
	The conclusion is clearly identified and logical.			
Reflect	The student evaluates in writing what has been learned (about self) from the project.			
	The student evaluates in writing what has been learned (about the topic) from the project.			
	The student makes connections with prior learning.			
	The student applies prior learning in a new and creative way.			
	The student connects the issue or concept to their own life and/or demonstrates a deeper understanding of the issue.			
Communicate	The student successfully uses the conventions of the chosen method of communication.			
	The student shows appropriate awareness of audience in their communication.			