Clemson Thinks²
Clemson University
Quality Enhancement Plan

SACSCOC On-site Visit April 15-18, 2013
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I. EXECUTIVE SUMMARY

One of the most important benefits that a university education affords students is the ability to think critically. While most teachers claim to teach critical thinking, and while many do, few can articulate precisely how it happens. *Clemson Thinks*, Clemson University’s Quality Enhancement Plan (QEP), is an ambitious experiment in critical thinking that aspires to transform student learning and faculty teaching across the curriculum and in the disciplines. The foundation of this effort will be a series of second-year critical thinking (CT²) Seminars, a cohort of CT² Faculty Scholars, a faculty development program, a rigorous assessment plan, and a scholarly research program.

Clemson is a land-grant university that cultivates the intimate atmosphere of a smaller school. *Clemson Thinks* capitalizes on this unique combination by leveraging the resources of a major research university to create a classroom environment more typical of a liberal arts college. At a time when terms such as “massive” and “online” are used to describe pedagogical innovations, *Clemson Thinks* proposes small, engaged learning experiences to promote careful reading, thoughtful exchange, effective writing, and above all critical thinking. Modeled in part on courses taught in Clemson’s Calhoun Honors College, CT² Seminars will offer an honors experience to all Clemson students.

After soliciting proposals from the university community, analyzing assessment data pertaining to student learning outcomes, and thoroughly reviewing the literature, the QEP Steering Committee made two determinations: (1) the QEP will enhance critical thinking, and (2) the QEP will target second-year students. The committee drew on elements from various QEP pre-proposals – submitted by students, faculty, and staff – in order to formulate a plan that enhances teaching and learning at Clemson. CT² Seminars will be taught both in the general education...
curriculum and, when possible, in various major curricula. Faculty will have significant flexibility in determining the content of each seminar, though all seminars will be open to all students regardless of major. The seminars will enroll fewer than 20 students and conduct pre- and post-seminar assessment using a nationally validated assessment of critical thinking such as the Critical Thinking Assessment Test (CAT) or the California Critical Thinking Skills Test (CCTST). In addition, the CT² Seminars will be communication-intensive, involving significant written assignments and in-class discussions, thereby advancing Clemson's award-winning Writing Across the Curriculum initiative.

*Clemson Thinks²* has the potential to transform student learning at Clemson through all four years of college. However, the QEP itself targets the second year. Because this transitional time falls between first-year experiences and general education courses, on the one side, and engaged learning opportunities and major courses, on the other, it often receives less focused attention. For those same reasons, however, the second year presents students with an ideal opportunity to build on their foundational courses by enhancing the critical thinking skills that will prepare them to engage at a higher level in the classroom, in the community, and in their careers.

*Clemson Thinks²* advances the university's strategic plan, laid out in the “2020 Road Map”: to become a top-20 Public University, to recruit a top-15 freshman class, and to create an engaged learning environment and honors college experience. Above all, it accepts as a challenge President James Barker’s remark to the May 2012 General Faculty Meeting: “Our plan needs to have a strong, clear focus on the core of the core – the heart of the heart – which is the classroom experience.”
II. PROCESS USED TO DEVELOP THE QEP

OVERVIEW OF THE PROCESS
Clemson University is a large, public, land-grant university enrolling over 19,000 undergraduate, graduate, and professional students. It has a longstanding commitment to high-quality undergraduate education and a proud tradition of public service. Designing a QEP that would transform education at Clemson was a challenging endeavor that required the support of students, faculty, and staff from throughout the institution. This section describes the process used to develop and adopt the Quality Enhancement Plan at Clemson.

*Clemson Thinks* developed through an extensive process that included grassroots input from teams across the university who submitted proposals for the QEP. Members of the Steering Committee examined assessment data that pointed to areas where Clemson’s students were not making the kinds of gains that would be expected of students who complete their degree at a top-25 public university. A survey of the literature suggested that the sophomore year was often a lost year between the excitement of the first-year experiences and the focus and depth of study students experienced in their junior and senior years. All three sources of information – campus input, assessment data, and the literature review – were an important part of the early review process.

After considering a large number of proposals and reviewing the vast literature on student achievement and engagement, the Steering Committee decided that a focus on the development of critical thinking skills during the second year of college would have the most significant impact on student development. The core feature of the proposal took the form
of a second-year critical thinking seminar that would build student critical thinking skills and serve as a gateway for greater engagement in learning throughout the junior and senior years.

Prior to finalizing the plan, the Steering Committee sought input from a wide variety of campus groups including the faculty, student government, alumni, university administration, community stakeholders, and the Board of Trustees. This feedback validated the choice of critical thinking as a major focus but also pointed out areas, particularly pertaining to implementation, that called for further development and refinement. The Steering Committee incorporated this feedback before finalizing the topic and developing the plan.

Once the Steering Committee finalized the QEP topic and approach, the members turned their attention to designing the critical thinking seminar, establishing needed faculty resources, and implementing the plan. The team established that each critical thinking seminar would: (1) enroll under 20 students in a second-year, communication-intensive seminar; (2) be open to students from any major; (3) include a standardized, objective pre/post-assessment of students’ critical thinking skills; (4) be taught by faculty who have completed development programs aimed at instruction in critical thinking. Thus, the seminars will provide second-year students with an opportunity to interact with faculty members who have demonstrated expertise in both their own field and in critical thinking instruction and to do so in an intimate classroom setting. Over time, such experiences will create an ongoing dialogue about critical thinking and transform the culture of teaching and learning at Clemson University.

FORMATION OF THE QEP TEAM
The university began to develop the QEP in 2010 when faculty and administrative leaders attended a SACSCOC reaffirmation orientation in Atlanta. University President James Barker appointed a Steering Committee based on recommendations of College Deans and Vice Presi-

Over time, such experiences will create an ongoing dialogue about critical thinking and transform the culture of teaching and learning at Clemson University.
President Barker appointed Dr. Debra Jackson, Vice Provost for Academic Affairs and Assistant to the President, and Dr. William Surver, Alumni Distinguished Professor of Biology and former Faculty Senate President, as co-chairs of the Steering Committee (Appendix A).

President Barker charged the Steering Committee with responsibility to select, plan, and implement the QEP on behalf of Clemson University. In his instructions to the Steering Committee, President Barker outlined six requirements for the QEP:

1. It must align with Clemson’s 2020 Road Map (Appendix B).
2. It must be campus wide.
3. It must be open to all.
4. It must involve engagement.
5. It must be transformative.
6. It must be sustainable.

Under this charge, the Steering Committee began its work in September 2011.

SOLICITATION AND EVALUATION OF PRE-PROPOSALS

The Steering Committee began its deliberations by soliciting QEP proposals from across Clemson University. Students, faculty, and staff were invited to submit five-page pre-proposals that described an idea or concept related to student learning, aligned with Clemson’s 2020 plan, and were suitable for implementation as a campus-wide quality enhancement initiative. Pre-proposal requirements were deliberately kept relatively simple in order to secure the widest possible input.

The Steering Committee’s leadership established a website with information about SACSCOC reaffirmation of accreditation and the Quality Enhancement Plan process. The site also provided links to past suc-
cessful QEP initiatives at peer institutions from across the region. These resources were intended to provide proposal teams with enough background in order to develop a competitive proposal.

Groups from across campus submitted 21 proposals. Steering Committee members read all 21 proposals and scored them based upon alignment with the Clemson 2020 plan and potential to encourage broad-based university involvement as well as identification of specific and measurable student learning outcomes. Team members also scored each proposal on six qualitative attributes: innovation, degree of daring, transformative potential, uniqueness, relevance, and focus.

As the result of this process, six of the 21 proposals were selected as "finalists." Each of these is summarized briefly below:

“Clemson Grand Challenges”: This two-part QEP proposed a junior/senior level seminar in which students would work with a faculty member who has expertise in one of the “grand challenges” of the 21st century (e.g., environmental sustainability, renewable energy resources, health disparities, literacy, deindustrialization, etc.). Participants in the seminar would develop a project or technology proposal designed to address this challenge. Students would then present their proposal at a two-day showcase modeled on the TED (Technology, Entertainment and Design) conferences.

“CU in the World”: The intent of this proposal was to increase students’ engagement in cross-cultural and international educational experiences. This proposal combined service learning, study abroad, and classroom engagement to provide a more coherent framework within which students could make use of international experiences to better prepare them for life after their university education is complete.

“Enduring Questions Seminars”: The Enduring Questions QEP aimed to enhance general education at Clemson by rethinking the existing Arts and Humanities requirement as a series of writing-intensive seminars. The proposal called for each year’s seminars to be focused on a specific question (e.g., what is life?, what is friendship?, why war?, what is evil?) and to employ a core text. The proposal also called for training a cadre of advanced undergraduate writing fellows trained by Clemson’s Writing Center and assigned to work with students to develop their critical thinking and writing skills.

“Reinventing General Education”: This submission proposed revising general education so that it better reflects the complex world students encounter when they graduate. Specifically, the proposal’s authors recommended modeling a reinvented general education around a one- or two-semester intensive immersion experience.

“Research Skills and Critical Thinking”: This proposal recommended developing a three-semester course sequence designed to develop students’ research and critical thinking skills. The sequence would begin
with a basic overview of research and research methods followed by two courses on formal logic. The experience would culminate in an undergraduate research project in the student’s major field.

“Stewards of Place”: Authors of this proposal called for the development of an undergraduate research and service learning infrastructure through which Clemson students could use knowledge gained in their majors to address social, economic, and technical challenges facing residents in Pickens County, in which Clemson University is located.

**LINKING FINALIST PROPOSALS TO ASSESSMENT DATA**

Once the six finalist proposals were identified, the team turned to evidence from assessment data in order to identify areas of student achievement that would most likely benefit from a quality enhancement plan. Three types of data were central to this evaluation: Graduate Record Examination (GRE) scores, Educational Testing Service (ETS) Proficiency Profile data, and artifacts from the ePortfolios required of all graduating seniors at Clemson.

Evidence from GRE scores showed that Clemson students scored near the national mean on analytical writing and verbal reasoning. Given Clemson’s status as a top 25 public university, the committee viewed these results as insufficient and as evidence of the need to give greater attention to fostering critical thinking and writing abilities among our undergraduate students.

Assessment data from Clemson University’s ETS Proficiency Profile testing allowed the Steering Committee to examine how a cross sample of students progressed across their four years at Clemson. The evidence...
showed that the weakest area was critical thinking for which 57 percent of the seniors graduating in the 2008-2010 academic years were judged not proficient. Similarly, 48 percent of graduating seniors were scored “not proficient” in level three writing, a core element of effective critical thinking (Appendix C). Thus, the ETS proficiency test results signaled areas of need that were consistent with those identified from the GRE data. The Steering Committee noted in particular the apparent lack of improvement by Clemson students in the area of critical thinking over their four years of college.

Finally, the Steering Committee also examined findings from Clemson University student ePortfolios. These data were gathered when teams of faculty evaluated artifacts from General Education competencies. These data showed that, while overall critical thinking was among the highest scoring competencies, notable weaknesses were identified in students’ ability to identify critical thinking techniques, to select and apply techniques most appropriate to a specific task, and to effectively communicate the results, especially in written form (Appendix D).

After evaluating the assessment data, the Steering Committee concluded that critical thinking was the area of intellectual development most conducive to broad-based university participation and most likely to benefit from the kind of sustained focus available through the QEP process. At the same time, the Steering Committee recognized that critical thinking and effective communication go hand-in-hand. With these determinations in mind, the Steering Committee returned to the six finalist proposals and reread and reevaluated them in light of the assessment data.

The reevaluation revealed that no single proposal provided the focus on critical thinking indicated by the assessment data while also meeting the criteria cited by University President Barker in his charge to the QEP committee: that the QEP be innovative, daring, transformative, unique, relevant, engaged, and focused. However, it was clear that by combining elements of several of the finalist proposals, it would be possible to develop a QEP that builds upon student intellectual needs as demonstrated by assessment data and that fulfills President Barker’s charge.

From this process emerged the basic design of *Clemson Thinks* 2, the Clemson University QEP: a program of critical thinking development anchored by a second-year seminar experience and focused on developing students’ ability to think critically and to communicate effectively. This program was to serve as a springboard for student involvement in more sophisticated and sustained types of intellectual work through their major coursework and engagement experiences. Another cornerstone of the QEP was a structure that would permit the development of a faculty critical thinking community – a group of critical thinking scholars who had completed a common faculty development process and who operated as their own self-reflective critical thinking community. *Clemson Thinks* 2 therefore imagines critical thinking as a skill developed in the classroom, as a practice employed in the lab and in the world, and as an ethos that defines the university community of scholars, teachers, and students.
SOLICITING FEEDBACK FROM THE CLEMSON COMMUNITY

Before any formal planning began for *Clemson Thinks²*, the QEP Steering Committee solicited feedback through several avenues. A QEP website offered a blog format where questions were posed to the university community and answers posted by respondents. In addition, the committee engaged in a series of town hall meetings and presentations to important stakeholders in the university community. Three sessions were held in May and June of 2012; one session was limited to faculty only, the other two sessions included faculty and staff. The sessions were intended to introduce the initial QEP proposal and to solicit feedback and suggestions regarding its appropriateness as a choice for the Clemson University QEP (Appendix E).

In addition to the town hall meetings, QEP Steering Committee members presented the QEP to the Faculty and Student Senates, the Academic Council, the Administrative Council, the Board of Trustees, the Board of Visitors, the Organization of Academic Department Chairs, and the Undergraduate Curriculum Committee. During this period, the members of the QEP Steering Committee also met with SACSCOC Vice President Barry Goldstein in order to obtain preliminary feedback on the QEP proposal.

In general, the focus on critical thinking and the overall design for *Clemson Thinks²* received affirmative responses but university stakeholders also raised a number of important issues that needed to be digested and folded into the plan before the *Clemson Thinks²* design could be finalized. The following modifications were made and/or the following components were added to *Clemson Thinks²* in response to issues raised during this comment period:

1. *CT²* Seminars can be new courses or can be existing courses that are modified to include an explicit emphasis on critical thinking.

2. *CT²* Seminars will enroll fewer than 20 students and be open to all students in their second year in college.
3. \(CT^2\) Seminars will be taught as a part of faculty members’ regular teaching loads rather than as additional courses.

4. In order to qualify to teach a \(CT^2\) Seminar, faculty members will complete a week-long summer \(CT^2\) Faculty Institute. The institute will provide a baseline level of expertise in critical thinking and critical thinking instruction.

5. The initial implementation of \textit{Clemson Thinks} will not involve changes to Clemson’s existing general education curriculum. Decisions regarding the inclusion of \(CT^2\) in general education will await assessment of the program and a broader discussion about general education among all stakeholders in the university.

6. \(CT^2\) Seminars may be taught in the disciplines – i.e., as part of a major curriculum – provided they meet the above criteria.

7. \(CT^2\) Seminars will be assessed to measure gains in students’ critical thinking skills and the results of this assessment will inform best practices, curricular revisions, and program administration.

8. \(CT^2\) Seminars will not be required for graduation until assessments indicate that the program is meeting its goals. However, across the full life-cycle of the QEP, the number of available seminars will increase to the point where virtually all second-year students will have an opportunity to enroll. Conversion to a requirement would then be possible.
Assessment Data: ePortfolio and ETS

Definition of Critical Thinking:
“Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness (Scriven and Paul, 1987).”

Student Learning Outcomes
1. Explore complex challenges
2. Analyze multi-dimensional problems
3. Extrapolate from one conceptual context to others
4. Synthesize alternative solutions to multi-dimensional challenges
5. Communicate effectively complex ideas

CT Faculty Scholars
- Faculty Development required to be a CT Scholar
  - 4-day program developed for summer institute
  - Active Participation in Annual Programs
  - Pre/Post Assessment of Courses
  - Evaluation

Creative Inquiry Fellows Program
(To be developed with similar criteria, based on the CT Faculty Scholars model)
- Faculty Development
- Active Participation
- Assessment Strategies
- Student Learning Outcomes

Duke University Incentive Model of “Scholars” recognized by the University, provided $5000 supplement as long as remain a CT Scholar (think Alumni Professor)

Incentive – $5000 to support faculty and student expenses

Based on review of the literature regarding faculty teaching critical thinking.

Second Year Course
- Class size under 20
- Critical Thinking
- Taught by CT Scholars
- Interdisciplinary and Disciplined Based as long as open to all students
- Communication intensive
- Enhance academic and engagement experiences
- Assessment Strategies
  - Pre/Post Test in the course
  - Summative Assessment
  - ePortfolio Artifacts
  - ETS Proficiency Profile
  - Tracking system of students in CT courses

Operationalization of the Course(s)
Steering Committee develops interdisciplinary courses that meet the CT requirement and a general education requirement for submission to Undergraduate Curriculum Committee.
CU 21X (CT) Natural Science and Mathematics
CU 22X (CT) Science, Technology and Society
CU 23X (CT) Social Science
CU 24X (CT) Cross Cultural Awareness
CU 25X (CT) Humanities and Literature
CU 26X (CT) Humanities and Non-Literature

Steering Committee develops a system to approve Critical Thinking designation for current discipline based courses. (Similar to the Honor College model).

Engage the Undergraduate Curriculum Committee in course approvals.
Volunteer to work with UCC to improve the Critical Thinking Component of the ePortfolio.

To better inform future direction, the Steering Committee is proposing a formal pilot phase, with results informing and changing the direction of implementation
- Writing Intensive versus non-writing intensive
- Under and Over 20
- Interdisciplinary versus discipline based
- Links to engagement—using pre and post assessment strategies

RESEARCH FOCUS—LINKING CRITICAL THINKING, CREATIVE INQUIRY, AND ENGAGEMENT
PILOT CT^2 COURSES

A crucial element of Clemson Thinks^2 is a two-year pilot phase in which smaller numbers of CT^2 Seminars are to be offered, assessed, and further developed. During this period, the overall framework of the QEP will be tested and, if necessary, modified prior to scaling the program up for delivery across the full second-year cohort. During the pilot phase, a number of types of CT^2 course methods will be employed, assessment tools will be evaluated, and further student and faculty feedback will be gathered. As a result, a wide variety of course approaches will be considered, including CT^2 courses taught in sections enrolling more than 20 students and courses using alternative approaches to building critical thinking skills. The purpose of this experimentation is to assess the extent to which the planned approach for teaching critical thinking (small, communication-intensive seminars) does, indeed, provide results that are superior to other approaches.

The pilot phase began in Fall 2012 with five pilot CT^2 Seminars, including an interdisciplinary, team-taught course on sustainability; a first-year writing seminar in the Calhoun Honors College; a course on reading, writing, and critical thinking in the Department of English; and two sections of a course in formal logic in the Department of Philosophy and Religion. During this initial semester, the focus was primarily on developing a mechanism for assessing individual seminars and for gathering data on existing pedagogical practices. Additional course pilots will begin in the 2013-2014 academic year.

PLANNING FOR THE LAUNCH OF CLEMSON THINKS^2

University advancement, communications, and marketing staff joined the QEP Steering Committee in order to develop a branding strategy and communication plan for Clemson Thinks^2. Their charge included identifying a central theme around which the QEP launch could be organized as well as developing and implementing a communication strategy that would give every member of the Clemson community an understanding of the QEP, its goals, and their role in its success. In November 2012, the group proposed Clemson Thinks^2 as the title for the QEP. At its final meeting of 2012, the QEP Steering Committee officially adopted Clemson Thinks^2 as the name of the Clemson University Quality Enhancement Plan.
III. IDENTIFICATION OF THE TOPIC

BACKGROUND
In April 2011, Clemson University approved a new strategic plan. The Clemson 2020 Road Map has as two of its strategic priorities to 1) enhance student quality and performance and 2) to provide engagement and leadership opportunities for all students (Appendix B). The QEP Steering Committee believes enhancing student performance begins early in students’ academic careers and that in order to effectively engage students outside of the classroom, Clemson faculty must first directly engage them inside the classroom. These principles form the strategic foundation of Clemson Thinks². It is envisioned that the Clemson Thinks² Seminars will be an avenue through which participating faculty can explore the use of innovative teaching and delivery models for teaching critical thinking skills to undergraduate students. Clemson Thinks² also prepares students for engagement outside of the classroom because it gives them the kinds of high-level reasoning and communication skills that will allow them to draw greater educational and professional value from engagement experiences.

If our students are to value critical thinking skills, they must sense the same values in our faculty. The success of the CT² Seminars thus hinges on the active participation and pedagogical expertise of the faculty. In order to be successful in teaching critical thinking, our faculty must not only be enthusiastic about teaching critical thinking skills but also must have the competency and foundation to do so. Clemson Thinks² thus compensates faculty participation and develops critical thinking pedagogy.

The basic principles of Clemson Thinks², therefore, are as simple as they are potentially transformative: (1) allow faculty members to develop seminar topics based on their areas of interest and expertise, (2) familiarize those faculty members with best practices in critical thinking pedagogy, and (3) put faculty members in a position to develop individual and sustained relationships with a small group of students. Based on these principles, we believe that Clemson Thinks² can transform required courses into learning experiences designed to impart the critical thinking skills that will allow students to succeed in and beyond the classroom.

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CLEMSON THINKS² SEMINARS

CT² Seminars are designed to enhance critical thinking among Clemson students. Critical thinking is an abstract topic that, on its own, may appear irrelevant to students. However, the literature shows that covering critical thinking in the context of topics that excite students will help increase motivation to learn and practice it. These seminars provide a rich, shared, intellectual experience for second-year Clemson students in which they work closely with faculty, graduate students, and fellow undergraduate students to develop creative responses to challenging questions. This seminar provides a foundation to help students address selected challenges and questions through critical thinking and engaged learning at Clemson and beyond.

A common element for each seminar will be learning objectives consistent with the ETS Proficiency Profile’s assessment of critical thinking, which are enumerated in the following section on Student Learning Outcomes.

SEMINAR LOGISTICS

The CT² Seminars are targeted for students with second-year standing: those who have completed at least one year of college. This is a group of students that the QEP committee and literature identified as underserved. They generally lack the targeted programs of first-year students and in many cases have not yet developed significant identification with a particular major or department.

To encourage meaningful interaction between instructors and students, each CT² Seminar will be limited to fewer than 20 students. To encourage student and faculty interaction across academic units and departments, CT² Seminars will be open to all students and not restricted to students in a particular major or department. In certain circumstances, CT² Seminars will be offered in a specific discipline or as part of a major curriculum.
To help ensure they are viewed as equally important as other courses, CT² Seminars will be three credits and graded on an A-F scale. Best practices show that graded seminars are more likely than pass-fail seminars to succeed for both students and faculty.

SEMINAR FACULTY
Those faculty who complete the Clemson Thinks² Faculty Development Program, including a CT² Faculty Institute and participate in continuing CT² workshops, detailed below, are eligible to teach CT² Seminars. Our goal is to provide the best instructors for the students, regardless of title. Tenured and tenure-track faculty, lecturers, staff, emeriti faculty, post-doctoral fellows, advanced graduate students, and administrators will all be eligible to teach CT² Seminars provided they have the academic qualifications required to teach at the university level, complete the CT² Faculty Institute, and continue to participate in the Clemson Thinks² Faculty Development Program. Team-teaching will be encouraged.

SEMINAR CONTENT
As long as Seminars meet the critical thinking learning objectives, instructors will have the flexibility to define course topics and content-specific learning objectives. While the critical thinking student learning objectives (and their assessment) will be standard across courses, the means by which they are achieved will vary depending on the instructor.
Indeed, in light of the lack of consensus in the literature on a single best way to teach critical thinking, we envision *Clemson Thinks*\(^2\) as a forum for experimenting with innovative pedagogies and studying their effectiveness. We do expect that, after participating in the *Clemson Thinks*\(^2\) Faculty Development Program, instructors will apply established best practices for teaching critical thinking: reading texts closely and critically; discussing and debating issues in class; as well as writing and revising substantive papers. In addition, *CT*\(^2\) Seminars will provide students with a foundation for incorporating critical thinking in future engagement experiences at Clemson and beyond. This aspect of the *CT*\(^2\) Seminars is essential to ensure that they contribute to Goal 3, detailed in the next section.

A subcommittee of the QEP Steering Committee has initiated the process of introducing *CT*\(^2\) Seminars as options in multiple requirements of Clemson’s current general education curriculum. A faculty member with expertise in each general education area has been identified and is working with the subcommittee to create courses and to shepherd them through Clemson’s curriculum approval process. The targeted completion date for this process is May 2013. Proposed course syllabi would follow the rubrics as follows:

- CU 21X Critical Thinking Seminar in Natural Sciences/Mathematics
- CU 22X Critical Thinking Seminar in Science & Technology in Society
- CU 23X Critical Thinking Seminar in Social Sciences
- CU 24X Critical Thinking Seminar in Cross-Cultural Awareness
- CU 25X Critical Thinking Seminar in Arts & Humanities (Literature)
- CU 26X Critical Thinking Seminar in Arts & Humanities (Non-Literature)

For example, a proposed *Clemson Thinks*\(^2\) Seminar called “Sustainability Leadership” would be classified as a CU 220 course. A description for this *CT*\(^2\) Seminar in the course catalog would read: “Participants will learn how principles of environmental, social, and economic sustainability apply in contexts ranging from personal lifestyle choices to the built environment to operation of public and private institutions. Participants will also develop and practice skills to act as agents of change in the University and the broader community” (Appendix F).

In addition to the critical thinking learning objectives, learning objectives specific to this *CT*\(^2\) Seminar may be that students will be able to:

- define sustainability;
- identify and discuss fundamental issues of sustainability;
• analyze how their values relate to sustainability, and how their actions impact sustainability issues;
• recognize interrelated systems;
• evaluate the role of their major in sustainability issues;
• apply sustainability concepts on local and global scales; and
• practice change agent skills for sustainability.

Critical thinking seminars that fulfill other requirements and come out of other disciplines will likewise develop specific topics but achieve similar learning objectives. For example, a seminar on “Literature and the Environment” could be offered to meet the “Arts & Humanities: Literature” general education requirement; a seminar on “Inequality” to meet the “Social Science” requirement; a seminar on “Globalization” to meet the “Cross-Cultural Awareness” requirement; a seminar on “Ethics” to meet the “Arts & Humanities: Non-Literature” requirement; a seminar on “Scientific Reasoning” to meet the “Mathematics and Natural Science” requirement. Samples of CT² Seminar proposals submitted for approval can be found in Appendix F.

ACROSS THE CURRICULUM
By developing course rubrics keyed to existing general education requirements, multiple benefits ensue. First, CT² Seminars can be incorporated across the curriculum without having to initiate a whole-scale revision of Clemson’s general education curriculum during the pilot and phase-in portion of the implementation plan. While there is desire from significant constituencies among Clemson’s faculty and students for such a revision, the process involved goes beyond both the purview and the timeline of the QEP Steering Committee. That being said, the broad scope and flexible design of the CT² Seminars ensures that they could be implemented into any future revision to the structure of general education at Clemson.

Second, by linking CT² Seminars to general education requirements, students will be able to make progress toward completing their degree requirements through participation in a CT² Seminar. The value of students not only receiving course credit but also fulfilling a degree requirement through participation in a CT² Seminar cannot be underestimated.
system, they would be seen by many students as an additional burden or as not as significant as “regular” courses. If CT² Seminars counted only as electives and did not fulfill degree requirements, moreover, they would not enroll a sufficient number of students to effect a university-wide change.

Third, the broad disciplinary coverage of the general education requirements ensures that faculty will have significant latitude and scope in designing the content of a proposed seminar. As a result, faculty will have an incentive to participate in Clemson Thinks², as it will allow them an opportunity to teach topics that may not easily fit into the standard curriculum. In addition, team-teaching opportunities will be fostered and faculty from departments who typically do not teach courses that fulfill general education requirements will be able to contribute to the general education of Clemson students. Even more importantly, students will have a wide variety of topics from which to choose and thus will be able to enroll in a seminar that captures their interest and piques their curiosity.

Fourth, the infusion of faculty development and assessment into the curriculum has the potential to change the approach of the faculty to design and implementation of courses. Faculty who participate in the CT² Faculty Institute, discussed below, are likely to use the strategies they learn in all of their courses, not only the CT² Seminars. Similarly, as more faculty come to understand how assessment of learning outcomes can be integrated into course activities, this approach is likely to become a standard of pedagogical practice at Clemson. Thus, we can over time expect to see improvements in teaching and learning that reach far beyond the CT² Seminars.

Finally, the infusion of energy and resources into existing general education requirements promises to enhance the quality of all Clemson students’ learning experiences. Whole-scale revisions to a general education curriculum at a university the size of Clemson take years to accomplish and rarely satisfy all of the stakeholders. However, providing a mechanism for faculty to improve general education one seminar at a time, and in the process to introduce critical thinking across the curriculum, could potentially revolutionize teaching and learning in the general education curriculum from the ground up. While the general education curriculum does not always receive the most attention or excite the most interest, it is one of the only shared experiences for all Clemson
undergraduates. Because *Clemson Thinks*² directs university resources, faculty expertise, and student interest toward the general education curriculum, it promises to enhance learning for all Clemson students.

**IN THE DISCIPLINES**
The *Clemson Thinks*² plan recognizes that despite the benefits afforded by working within and across the general education curriculum, there will be faculty interest in and student demand for *CT²* Seminars in the academic disciplines and major curricula. *Clemson Thinks*² is designed to accommodate this interest and demand. While the majority of *CT²* Seminars will be taught as general education courses (i.e., either existing general education courses modified to also be *CT²* Seminars or the CU2XX courses described above), proposals to incorporate or adapt existing courses outside of the general education curriculum as *CT²* Seminars will be encouraged, provided that those courses conform to the guidelines about class size, enroll primarily second-year students, accommodate students from all majors, and meet the requirements for student learning outcomes. As with *CT²* Seminars taught across the general education curriculum, faculty teaching *CT²* Seminars in the disciplines will be required to successfully complete the *CT²* Faculty Institute.

*Clemson Thinks*² is designed not only to allow *CT²* Seminars in the disciplines but also to help make them possible. For example, the *CT²* office could fund an additional section of a sophomore-level course that meets all of the requirements outlined above except for the class size. With such funding, two or more smaller versions of the course could be offered. The assessment data yielded from disciplinary *CT²* Seminars would provide useful information about the relative value of teaching critical thinking in the disciplines as opposed to across the curriculum and in small seminar classes versus large lectures.
Obviously, not all or even most disciplinary classes will be as conducive to the $CT^2$ Seminar format as the seminars embedded in general education requirements. In some disciplines, even sophomore-level courses will carry prerequisites that effectively preclude opening the course to all students. In other cases, enrollment pressures, available faculty, and related considerations will be difficult to surmount. While recognizing these challenges, and in light of feedback from students, faculty, and administrators, the QEP Steering Committee worked to develop a model for Clemson Thinks$^2$ that focuses primarily on teaching $CT^2$ Seminars across the general education curriculum while nevertheless remaining open to innovative approaches to teaching critical thinking within the major curricula. The goal of Clemson Thinks$^2$ is simple: to improve the critical thinking abilities of Clemson students. As a result, the plan is designed to encourage a variety of approaches, to assess the effectiveness of those approaches, and to develop and promote those approaches that prove most successful.

**SEMINAR ASSESSMENT**

Formative assessment of critical thinking in the Seminar will be measured using the Critical Thinking Assessment Test (CAT) and the California Critical Thinking Skills Test (CCTST). The “Assessment” section describes this assessment in more detail, including how it ties into overall QEP assessment.

**SEMINAR DEMAND**

Seminars will not be mandatory. Our plan is designed with the intention to create a student demand for these seminars because of the relevant topics, exceptional instructors, small class sizes, and multidisciplinary interest. Our goal, as detailed in the sections “Actions to be Implemented” and “Timeline,” is to offer 40 seminars (~750 students) in the 2013-2014 academic year. (These will be a part of the instructional pilot phase.) By 2017-2018, we hope to have scaled up the program in order to accommodate up to 4,000 second-year students. Based on current enrollment, this would represent over 90 percent of second-year students at Clemson.
FACULTY DEVELOPMENT

An important component of the QEP will be the development of a formal faculty development program focused on critical thinking to complement the opportunities for professional development through Clemson’s Office of Teaching Effectiveness and Instruction (OTEI). This program will pursue multiple, related goals:

- provide thought-provoking discussions of critical thinking
- learn best practices in critical thinking pedagogy
- build and nurture a community of “CT² Scholars” committed to improving the teaching of critical thinking skills
- deliver necessary resources to assess students’ mastery of critical thinking skills.

The Faculty Development Program has a primary goal to develop the “community of faculty scholars committed to and prepared for instruction in critical thinking.” This community will form around a shared interest in critical thinking and will encompass instructional faculty, co-curricular activities, and mentoring relationships. *Clemson Thinks²* seeks the engagement of the entire university in the discussion of the importance of critical thinking skills and the tangible benefit to students, faculty, and staff of incorporating critical thinking skills throughout the university. While the initial cohort of CT² Scholars will be small, the eventual goal will be to grow this community and to weave critical thinking skills throughout the fabric of the university.

The first goal of the Faculty Development Program is to define “critical thinking.” As the literature shows, and as discussed below in the “Literature Review and Best Practices” section, there is no simple statement that will suffice for all disciplines. The professional development program will address the broad range of skills, capacities, practices, and activities denoted by “critical thinking” by working toward developing a “definition space” for critical thinking as the first component of the program. Critical thinking discussions will be used to make connections between the various disciplines but also be used to identify and
evaluate their differences, fostering an atmosphere in which scientists and artists, engineers and economists, poets and psychologists work toward a common goal.

The two major components to the Faculty Development initiative are the:

1. CT² Faculty Institute development program required of CT² faculty and of graduate students who will be assisting faculty in teaching CT² courses

2. Continuing education of CT² faculty and the development of the community of scholars

To ensure faculty “buy in,” Clemson Thinks² Faculty Development Program will provide evidence that critical thinking skills can be improved, and that there are proven methods for developing those skills. Assessment in the form of pre- and post-tests will be used in the classrooms to gauge the overall improvement of the students’ critical thinking skills in the short term. As of fall 2012, the ETS Proficiency Profile test is administered to all first-year students and graduating seniors as part of Clemson’s long-term assessment plan. The professional development program will give the participants the opportunity to learn about the different assessment tools, help them to learn how to better assess critical thinking through communication (writing, presentations, and discussions), and will provide an exchange of ideas through the community of scholars on assessments that have or have not worked in the second-year seminar classes or even other classes that incorporate critical thinking.

Aspects of the development program will be incorporated into New Faculty Orientation and subsequent workshops and other scholarly events will be targeted toward these incoming faculty. There is no more effective way to change the university culture than to draw on the energy and experiences of that culture’s newest faculty members, as their enthusiasm can spill over the entire campus. The programs should also remain open to the need and opportunity to provide faculty development assistance to these new colleagues beyond those pertaining to critical thinking. This aspect could eventually result in formation of a proposed New Faculty Development Program, which would benefit both our entering faculty as well as graduate students and post-doctoral associates who are pursuing academic careers.

Clemson Thinks² Faculty Institute
It is envisioned that the substantive component of the Faculty Development Program will be structured as a CT² Faculty Institute, providing training for faculty who will be teaching the CT² Seminars and other critical thinking-oriented courses, as well as an ongoing forum for idea sharing and communication among these faculty, who will form a larger community of CT² Scholars.
The instructional content of the complete $C{T}^{2}$ Faculty Institute will include many participant activities and deliverables, such as a map of student learning outcomes, critical thinking discussion questions, writing assignments, test questions, and assessment rubrics. The $C{T}^{2}$ Faculty Institute is designed for the faculty who will be teaching the $C{T}^{2}$ Seminars focused on critical thinking. The Office of Teaching Effectiveness and Innovation will assist in program development to be held two times (or as needed) during summers, facilitating the involvement of invited experts in critical thinking as well as Clemson faculty. An outline of the faculty institute is found in Appendix G.

The $C{T}^{2}$ Faculty Institute outcomes for the participants include:

- design and develop a communication-intensive $C{T}^{2}$ Seminar on the topic or subject the faculty member chooses and that integrates targeted student learning outcomes related to critical thinking
- redesign and redevelop existing faculty members’ course(s) to integrate the targeted student learning outcomes related to *Clemson Thinks*\textsuperscript{2}
- develop and integrate activities and assignments into faculty members’ courses that will develop the targeted $C{T}^{2}$ skills in their students and enhance academic and engagement experiences
- develop strategies for engaging students and ensuring they comprehend assignments and are achieving $C{T}^{2}$ learning outcomes
- identify alternatives for assessing student $C{T}^{2}$ skills.
- monitor and assess students’ competency in $C{T}^{2}$ skills using multiple assessment instruments

**DEVELOPING A COMMUNITY OF CLEMSON THINKS\textsuperscript{2} FACULTY**

Beyond providing formal professional development in teaching and assessing critical thinking, *Clemson Thinks*\textsuperscript{2} seeks to foster a new university culture that prioritizes critical thinking as a student learning outcome. This culture will reinforce critical thinking in the classroom and promote faculty and student interest in this outcome.

In addition, the Director of *Clemson Thinks*\textsuperscript{2} will contract outside speakers and workshop facilitators who are experts in critical thinking to give campus-wide presentations and lead workshops, colloquia, and discussions for faculty and graduate students. The campus-wide speakers will be asked to highlight the importance of critical thinking in the professional and business world so that students can see the value of critical thinking skills and develop a desire to learn them. In addition, faculty leaders in the community of critical thinking scholars will lead workshops, colloquia, and discussions among their colleagues to share what they are learning from their own teaching experience, classroom research, and study.
CLEMSON THINKS² FACULTY

Clemson Thinks² seeks to develop a community of faculty scholars committed to and prepared for instruction in critical thinking. This CT² faculty community will consist of faculty teaching CT² Seminars, staff and faculty who are actively involved in promoting other arenas for critical thinking development, and graduate students who mentor undergraduates in both teaching and research endeavors. The community of faculty will include (1) CT² Instructors and (2) CT² Scholars.

CT² Instructors:
In order to teach a CT² Seminar, any member of the Clemson faculty can propose to develop a new course or to revise a current one. Individuals whose proposals are selected must complete the CT² Faculty Institute and, upon successful completion, will be designated CT² Instructors.

CT² Scholars:
Faculty who have served as CT² Instructors for at least two semesters and who have demonstrated excellence in critical thinking instruction can apply to be designated as CT² Scholars at Clemson University. The CT² Scholar designation will be term-limited, compensated, and contingent upon successful ongoing review. CT² Scholars will be recruited via a selection process developed by the Clemson Thinks² Office. CT² Scholars will be expected to participate in scholarly research initiatives related to critical thinking pedagogy. CT² scholars will also participate in the CT² Institute as instructors or facilitators as well as in ongoing professional development activities through the academic year. Finally, CT² Scholars will continue to teach CT² Seminars, participate in assessment, and support the Clemson Thinks² initiative.

LINKING CLEMSON THINKS² TO STUDENT ENGAGEMENT
The Clemson 2020 Road Map focuses on providing student engagement opportunities. Clemson has defined student engagement as:

Student engagement at Clemson University is characterized by active, collaborative, and experiential learning both in and outside the classroom. Students are involved in real-world, problem-solving and creative learning activities, with the goal of fostering ethical judgment and further developing their creativity, critical thinking, communications, and entrepreneurial skills. These activities and experiences include but are not limited to creative inquiry, service-learning, internship and co-op experiences, living/learning communities, and study abroad.
The specific objectives in the Clemson 2020 Road Map related to student engagement are to:

- teach differently to build a culture of creativity that stimulates new ideas;
- incorporate engagement and leadership throughout student life programming;
- add or enhance two living-learning communities per year;
- offer course credit for structured engagement experiences;
- double the number of students participating in Creative Inquiry, undergraduate research, service-learning, and study abroad;
- use the university as a laboratory, engaging students in running the university through internships and internal cooperative education experiences; and
- nurture creativity, critical thinking, communication skills, and ethical judgment in students.

Engagement will be integrated throughout a student’s educational experience at Clemson and can occur prior to, during, and after taking the CT² Seminar. Clemson Thinks², by virtue of its design and its position at the second year of a student’s education progression, is expected to facilitate increased engagement. In the CT² Faculty Institute, faculty will explore strategies for improving academic and engagement experiences through their CT² Seminars. CT² Faculty might also require their students to develop a plan for how they will reinforce and build upon the CT² skills they have learned in the seminar. A student’s plan could include participation in specific academic engagement activities such as study abroad, internships, Creative Inquiry, service-learning classes in their major area, or interdisciplinary offerings. The Clemson Thinks² office will work with the faculty and their students and assist them in finding academic engagement opportunities related to the students’ major area of study and/or interdisciplinary offerings that may be of interest to the student.
Faculty may also choose to collaborate with the Office of Residential Life to develop and offer unique and innovative CT² Seminars specifically for Clemson Living-Learning Communities (LLCs). This would give undergraduate residents the opportunity to take a CT² Seminar as part of the academic programming offered through an LLC. An opportunity also exists to develop and market interdisciplinary CT² Seminars to students living in the Sophomore Year Experience LLC. The community currently houses 283 second-year students from different majors. CT² Scholars interested in pursuing scholarly research related to student engagement or critical thinking could design a research study to determine if there is any potential relationship between participation in student engagement activities and improvement in students' CT² skills.

In addition to these examples, Clemson Thinks² seeks to foster other possibilities for how CT² Seminars can enhance academic and engagement experiences and result in the development of innovative teaching and delivery models for teaching critical thinking skills to undergraduate students. The individual passion and the synergy existing among the faculty who choose to become involved in the CT² learning community will no doubt lead to new ideas and new discoveries related to teaching, learning, service, and research.

PROFESSIONAL DEVELOPMENT PROGRAM BUDGET

CT² Faculty will participate in the CT² Faculty Institute and a payment incentive will be part of the total financial incentive package for participating faculty. Payment for completing the CT² Faculty Institute will be processed at the conclusion of the program; other incentives related to teaching CT² will be processed after faculty teach a course and maintain involvement with ongoing initiatives.
IV. STUDENT LEARNING OUTCOMES

The overarching goal of Clemson Thinks\(^2\) is to enhance the university’s culture and instructional processes in a way that enables measurable improvement in student critical thinking skills and in students’ ability to apply those skills in a wide variety of academic and non-academic contexts. We believe that such a cultural change is most clearly indicated when Clemson University students show sustained improvement in specific and measurable critical thinking abilities and when they are able to take these abilities and apply them outside the formal classroom environment. The heart of this cultural change, thus, lies in what students learn as a result of their involvement with Clemson Thinks\(^2\).

We envision that student learning will take place at multiple levels: in the \(CT^2\) Seminars, as students apply critical thinking skills in upper-division courses in their major, and as students apply these skills during engagement experiences such as internships, service-learning projects, and undergraduate research. At all levels, however, we believe that the same set of student learning outcomes applies. What changes is the students’ mastery of these critical thinking tools and the complexity of the situations in which students are able to make use of these tools.

DEFINITION OF CRITICAL THINKING

“Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness (Scriven and Paul, 1987).”

We draw our list of critical thinking skills from the ETS Proficiency Critical Thinking battery:

1. Determine the relevance of information for evaluating an argument or conclusion
2. Recognize flaws and inconsistencies in an argument
3. Evaluate competing causal explanations
4. Evaluate hypotheses for consistency with established facts
5. Determine whether an artistic interpretation is supported by evidence contained in a work

6. Recognize the salient features or themes in a work of art

7. Evaluate the appropriateness of procedures for investigating a question of causation

8. Evaluate data for consistency with established facts, hypotheses, or methods

*Clemson Thinks* focuses on the development of these critical thinking skills. The initiative’s success will be measured according to the following goals and student learning outcomes. These outcomes represent the process of intellectual development required to realize the potential of *Clemson Thinks*.

**GOALS OF THE C7 SEMINAR**

**Goal 1:** Through their participation in *Clemson Thinks*, students will develop university-level competence at the activities that characterize critical thinking. Importantly, not every C7 Seminar will teach all of the critical thinking skills enumerated above. Skills 1-4 (above) are general skills that are relevant to any C7 Seminar whereas skills 5 and 6 are most relevant to C7 Seminars in the humanities and skills 7 and 8 are most relevant to C7 Seminars in the behavioral and traditional sciences.

**Goal 2:** Through their participation in *Clemson Thinks*, students will describe the specific activities that characterize critical thinking and to reflectively report on their own use of these tools. If students are going to be able to effectively employ critical thinking outside the classroom environment, they must understand what aspects of their intellectual work constitute critical thinking and they must develop reflective self-awareness of their own critical thinking processes.

**Goal 3:** Students will apply critical thinking skills to solve problems that occur outside the academic classroom. In the context of the C7 Seminar, this learning outcome will be satisfied when students can identify and evaluate ways critical thinking can be applied to better understand and solve real world problems. However, for those students who pursue additional critical thinking opportunities this learning outcome may expand to the level of demonstration through a service learning project, an undergraduate research team, a co-op, or an internship.

**STUDENT LEARNING OUTCOMES**

Students will be able to:

1. Explore complex challenges
2. Analyze multi-dimensional problems
3. Extrapolate from one conceptual context to others
4. Synthesize alternative solutions to multi-dimensional challenges
5. Communicate effectively complex ideas
V. LITERATURE REVIEW AND BEST PRACTICES

CLEMSON’S QUALITY ENHANCEMENT PLAN IN CONTEXT
Since 2007, around 20 of Clemson's peer institutions have developed quality enhancement plans as a part of their SACSCOC reaffirmation of accreditation. In the process of developing our own QEP, we reviewed many of these proposals. It quickly became clear that our QEP idea reflects commonly held priorities in higher education – and by employers (Finley 2012: 3) – such as the need to encourage growth in critical thinking through improvement of students’ reasoning, problem solving, and writing skills (Arum and Roska 2010). At the same time, our QEP is unique in two ways. First, it focuses specifically on the second year of the undergraduate experience, which we believe is a crucial but overlooked period in students’ intellectual and social development. Second, we are building our QEP in light of the success of Clemson's Creative Inquiry program, which has institutionalized faculty-student research collaborations across campus. Our belief is that by implementing a teaching model that explicitly challenges students to develop the critical reasoning skills needed to collaborate with professional researchers, our students will improve their intellectual abilities – and be prepared to benefit from the intellectual, professional, and developmental opportunities offered by engagement programs such as Creative Inquiry, service learning, and study abroad. Because Clemson already is a leader in engaging undergraduates in out-of-the-classroom experiences, we are well equipped to enhance the quality of our students’ education by formalizing how we impart the critical thinking skills required to excel outside of the classroom – whether during one’s undergraduate years or beyond.

One of the core questions we have asked ourselves is whether a pedagogical intervention can, in fact, lead to growth in critical skills. What sorts of pedagogical interventions (if any) work best? Which are most expedient for delivery to large numbers of undergraduates? This literature review will investigate whether there is a case to be made for each of several potential components of our QEP: a single pedagogical intervention, small class size, a second-year course of study, communication-intensive courses, explicit treatment of critical thinking in class, continuing student engagement, and faculty development.

LITERATURE REVIEW

THE CASE FOR A SINGLE PEDAGOGICAL INTERVENTION
The literature on critical thinking is, to say the least, quite heterogeneous. There are many different ways to define, operationalize, and measure “critical thinking.” The scientific standards of the “studies” that have been published often are rather loose. The end goal of Clemson’s QEP is to generate quantitative data concerning the effect of a particular kind of course delivery – courses that rely on formal, intentional teaching of critical thinking skills – on student learning outcomes. We therefore have restricted ourselves to literature of a similar sort: studies based on quantitative data that show statistically significant gains in critical skills.
Frankly, this strategic decision rules out using the vast majority of publications purporting to study how to teach and assess critical thinking.

Even within these strict standards, however, it is clear that critical thinking interventions generally show positive results (Kennedy, Fisher, and Ennis 1991). Facione (2011) demonstrates that it is possible to learn to think critically. Two meta-analyses are especially interesting in this regard. First, an analysis of 29 different international studies (half in either the United States or United Kingdom) found effect sizes of approximately 0.62, which is considered quite impressive compared to most educational interventions of any sort (Higgins et al. 2005). Abrami and colleagues (2008) did an even larger meta-analysis of 117 different studies, finding a more modest but still sizeable effect size of 0.34. Meta-analyses such as these are the gold standard given the tremendous variation in research design across single studies – even those that are conducted with the greatest scientific precision.

It is useful as well to mention empirical results from the two tests we have chosen to assess student learning outcomes during the pilot phase of Clemson’s QEP. Several studies conducted on the California Critical Thinking Skills Test (CCTST) show that it is possible for a single undergraduate course to have a significant impact on students’ critical thinking skills. One study found significant increases in critical thinking scores across 39 sections of four different classes with strong, explicit critical thinking content (Facione 1990). Another study paired 260 students before and after taking a critical thinking class; 95 percent of these students’ scores on the CCTST improved by 1-2 points (Facione 1990). Still another experiment had one professor administer the CCTST pre- and post-tests to students in 28 different critical thinking classes and found significant improvements in scores (Anagnoson 2000).

The Critical Thinking Assessment Test (CAT), developed at Tennessee Technological University with support from the National Science Foundation, also has shown that a single class can produce significant increases in students’ critical thinking scores. For example, a recent study published in Science shows that a biology research course can produce significant increases in CAT scores (Gasper et al. 2012). Several other courses have yielded similar results, including one at Sam Houston State University that produces as much change in CAT scores as the average increase for an entire four-year college experience. There is also a biology course already taught at Clemson that has produced marked and demonstrable improvement in CAT results.

In short, there is compelling evidence supporting the merits of implementing a single pedagogical intervention.
THE CASE FOR SMALL CLASS SIZE

If, as our reading of the extant literature strongly suggests, a single pedagogical intervention has the potential to yield marked improvement in students’ critical thinking skills, then we must ask what characteristics such single-class interventions ought to feature. First, what size and style of course is best suited for imparting critical thinking skills to students?

If the goal is mastery of basic content, class size seems not to matter much. This result is counterintuitive to many faculty, but the reality is that many studies which seem to show that small class size matters do not correct for the fact that better students tend to seek out smaller classes (Hou 1994). Studies, however, also tend to classify any class with 70 or fewer students as “small,” leaving open the possibility that classes of 20 or 35 might be more effective still.

On the other hand, there is some indication that small class size is especially useful when the goal is to impart higher-order skills like critical thinking (Minnesota State University Mankato Center for Teaching and Learning 2012). Discussion-based classes (assuming the instructor keeps tight bounds on the direction of the discussion) can be extremely beneficial for getting pre-college students to question their assumptions (e.g., Auerbach 2012; Zwiers and Crawford 2011); presumably the same benefit accrues to college students.

The evidence regarding whether small class size is essential to improving critical thinking is mixed at best. However, we are eager to enhance Clemson’s student-focused nature by offering students as many options as possible to engage meaningfully with faculty. As Arum and Roska note, “student-focused institutions facilitate student development in many areas including critical thinking, analytical and problem-solving skills, and writing” (2011: 60).

Thus while there is reason to believe that there is some association between small class sizes and improved critical thinking skills, the existing research falls short of presenting a thoroughly convincing case. Therefore, Clemson Thinks offers an opportunity to improve upon the existing research. The lack of clarity in research on the importance of small class size is part of
the reason we have decided to have an extended pilot period in which multiple delivery mechanisms can be tried, including experimenting with class sizes larger than 20. The idea of a small seminar style class is intuitively appealing and likely will generate many important benefits for students and faculty alike, though it remains to be seen whether it is a superior method for developing critical thinking skills. As the pilot phase develops, the implementation team will monitor the results of the CT² Seminar assessments and determine the association between class size and improvement in critical thinking skills for Clemson students.

THE CASE FOR A SECOND-YEAR COURSE OF STUDY
We have chosen to focus on second-year students because the second year of the undergraduate experience is the period during which students are most likely to withdraw from full engagement with their academic work (Graunke and Woolsey 2005). In part, this withdrawal occurs because students in the second year, on average, receive less attention and mentoring from faculty and other institutional staff than do first-year students, juniors, or seniors. First-year students generally are the target of resources aimed at ensuring their transition to college and their successful retention into the second year. Upper-division students have chosen a major and thus benefit from the resources available to them through their home departments. In contrast, the second year often becomes a “lost year,” situated between the excitement of one’s first year in college and the later focus on career and graduate school preparation.

To date, relatively little research has examined ways of addressing the academic, personal, and social challenges that are unique to second-year students. Those that have, however, tend to offer similar recommendations: (1) increasing second-year students’ opportunities to work with faculty, particularly in areas that interest the student; (2) increasing the level of challenge contained in second-year course work; and (3) sustaining students’ sense that they are part of an intellectual community (Gahagan and Hunter 2006; Gohn, Swartz, and Donnelly 2001; Graunke and Woolsey 2005; Packard 2004; Schaller 2005). Our QEP is designed to address each of these recommendations straightforwardly. Although the evidence is mixed regarding whether small class size is necessary for growth in critical thinking skills, it is quite clear in general that students do benefit from the relationships they develop with faculty in smaller classes. Taking a particular professor’s CT² Seminar might inspire the student to undertake further research (for example, under the auspices of our existing Creative Inquiry program) with that same professor. By situating our CT² Seminars at the 200-level (i.e., designing the courses so they are especially appropriate for students’ second year at Clemson), we aim to provide second-year students with a challenging, focused intellectual experience that will provide structure for their future studies and out-of-the-classroom experiences. In a small seminar, there is nowhere to hide; students cannot help but encounter intellectual challenges in such a setting.
We conclude that there is ample reason to attempt the implementation of a program that is designed expressly for second-year students—with the explicit goal of improving their critical thinking skills and the broader goal of providing focus to this often “forgotten” year of their undergraduate experience. A pedagogical intervention like the one we plan to implement in the second year of the undergraduate career could guard against “drifting through college without a clear sense of purpose” (Arum and Roska 2010: 34).

THE CASE FOR WRITING-INTENSIVE VS. COMMUNICATION-INTENSIVE COURSES

It is often argued that teaching critical thinking skills requires a writing intensive approach rather than the communication intensive approach we have adopted with our QEP. For this reason, we examined the literature in order to assess evidence for the argument that writing is the only vehicle through which students can develop critical thinking skills. What became clear in our review is that few studies have explored this matter quantitatively. To be sure, there are plenty of articles that present anecdotes or argue normatively that writing is an effective way to teach critical thinking (e.g., Duffy 2012), but there is little quantitative data to support this claim. In fact, one study found an inverse correlation between the quality of writing and critical thinking skills: the better the writing, the worse the critical thinking skills (Condon and Kelly-Riley 2004).

Part of the problem in this thread of the literature is the aforementioned heterogeneity of the data. Studies of critical thinking are either too specific or too general to analyze something at the level of a “writing-intensive approach.” Some studies focus on highly specific techniques for teaching critical thinking skills. For example, there is a good bit of literature to suggest that Feuerstein’s Instrumental Enrichment approach is effective, but this intervention is designed specifically for developmentally delayed elementary school children (see Romney and Samuels 2001)—and thus hardly generalizable to the student population of a selective state university. More typically, studies analyze a handful of classes with an eye toward identifying those that work and those that do not work. Such studies use enough data to allow them to identify classes that produce a change in critical thinking scores, but they lack sufficient data to tease apart what specific teaching strategies mattered most in these classes. Even meta-analyses (e.g., Abrami et al. 2008; Higgins et al. 2005) are forced to aggregate class types and teaching strategies into broad
categories because of the variation in research design across the many studies they are comparing. For example, most meta-analyses use Ennis’ (1984) schema, in which classes are sorted into four (possibly overbroad) categories: (1) General/Separate—classes specifically devoted to teaching critical thinking skills; (2) Infused—classes in which critical skills are asserted to be infused within traditional disciplinary content; (3) Immersion—classes wherein critical thinking skills are supposed to emerge via student immersion in a discipline; and (4) Mixed—classes that combine intentional critical thinking instruction with infusion or immersion.

Ennis’ Immersion approach produces the smallest increase in critical thinking scores, while the Mixed approach produces the largest increase. Moreover, classes taught by instructors who have received explicit training in critical thinking produce the greatest improvements of all (Abrami et al. 2008). These findings indicate that the best strategy available to us involves providing our instructors with meaningful training about teaching and learning critical thinking skills—and subsequently encouraging them to use explicit critical thinking modules alongside discipline-specific content. There is some evidence to suggest that interdisciplinary course content can be especially powerful in the development of critical thinking skills because students learn to integrate various disciplinary perspectives (Forrest 1982; Terenzini et al. 1995; Winter 1981).

The dearth of good data also means that what we are attempting in our QEP truly is unprecedented. Not only is our proposal designed to benefit our students, but we also hope to push the boundaries of pedagogical understanding of how best to impart critical thinking skills. Thus, gathering and disseminating data from our QEP program might help faculty and students well beyond Clemson University.

If writing is to be used to assess critical thinking skills, it is essential to develop an explicit rubric for grading such assignments that has been proven valid and reliable. Facione and Facione (1994) developed an early version of such a rubric called the Holistic Critical Thinking Scoring Rubric, but this tool seems not to have sparked much research. Facione subsequently worked on developing the CTTST test; substantial research did follow the development of this instrument. A similar rubric for the assessment of critical thinking in student writing recently was developed at Washington State University. Their critical thinking project, de-
signed to dovetail with a variety of writing projects on campus, gave rise
to the *WSU Guide to Rating Critical Thinking* (Condon and Kelly-Riley
2004). This rubric seems to pass muster in terms of validity and reliability
(Haswell 1998, 2001; Huot 1996), but has sparked no research we could
find beyond the WSU campus.

In short, we see no compelling evidence to support a conclusion that
our critical thinking seminars must be writing-intensive courses. For this
reason, we have elected to focus on communication-intensive, rather
than writing-intensive, course designs. To the extent that we do decide
to assess evidence of critical thinking skills in student writing, we will em-
ploy a proven rubric. As with the debate over class size, we will also look
to our pilot phase for guidance as to whether writing or communication
intensive courses produce better results.

THE CASE FOR EXPLICIT TREATMENT OF CRITICAL THINKING IN
CLASS
Our review of the extant literature on critical thinking leads us to con-
clude that students need to know they are learning how to engage in
critical thinking. A majority of undergraduate students believe they attain
critical thinking skills in college, evaluating “themselves highly on many
of the same measures for which direct evidence indicates otherwise”
(Finley 2012: 15). We believe students incorrectly assume that the col-
lege experience teaches them how to think in large part because they
rarely are asked to consider how to think in any explicit, systematic way.
Reading a book such as Ruggiero’s *The Art of Thinking* (2012) or a crit-
ical thinking guide such as Paul and Elder’s *Miniature Guide to Critical
Thinking* (2009) might make students think about how to think without
requiring them to understand every detail of epistemology. Consciously
thinking about how to think also constitutes a form of “visible thinking”
(Ritchhart, Church, and Morrison 2011) or “meta-learning” (Biggs 1987),
terms that refer to being conscious of one’s own thinking and learning
processes. “It’s one thing for us as teachers to articulate the kinds of
thinking we are seeking to promote; it is another for students to develop
a greater awareness of the significant role that thinking plays in cultivat-
ing their own understanding” (Ritchhart, Church, and Morrison 2011: 15).

As we mention above, discussion-based components of college class-
es – which are possible only in low-enrollment seminars – help students
sharpen their assumptions by exposing them to the reactions of others.
Active forms of learning, such as in-class debates, “produces critical
thinking, engages problem solving, and promotes communication skills”
(Auerbach 2012: 518; see also Overholser 1992). Discussions and de-
bates may be presented to students explicitly as exercises designed to
foster their critical thinking skills. Part of the goal of *Clemson Thinks* is
to give students the opportunity to see themselves and their own thinking
process more clearly and to become skilled at recognizing and challeng-
ing their own assumptions.
FACULTY DEVELOPMENT: LEARNING TO TEACH CRITICAL THINKING

The CT² Seminar model has the potential to impact teaching and learning at Clemson University in ways that go beyond the direct context of the critical thinking courses themselves. We hope to move incrementally toward a material shift in how Clemson faculty tend to think about teaching. If the plan is successful, benefits will flow directly to our students. The purpose of the faculty development program is to create a framework within which faculty have the time and resources needed to engage in their own critical thinking experience and to carry that with them into their CT² Seminar designs.

Much like university students, a large majority of university professors say they value critical thinking (Arum and Roska 2010: 35) and assume that they teach critical thinking skills in their classes (Finley 2012: 18). Yet, longitudinal data suggest that the average college student’s critical thinking skills improve only negligibly over the course of a traditional college career (see Arum and Roksa 2010; Clemson Quality Enhancement Plan 2012) and the available extant research suggests that critical thinking is generally not the focus of effective or consistent classroom instruction (Glaser 1984; Facione 1990). This points to the need for a framework within which faculty have the opportunity to consider how they might revise their teaching techniques so as to more effectively impart critical thinking skills. Clemson Thinks² will attempt to fill this gap with its faculty development and CT² Scholars programs.

REVIEW OF RELEVANT CLEMSON UNIVERSITY ASSESSMENT DATA

Classification
Clemson University is a public research university classified by the Carnegie Foundation as follows:

- **Basic Type:** Research Universities (high research activity)
- **Size and Setting:** Large four-year, primarily residential
- **Enrollment Profile:** High undergraduate
- **Undergraduate Profile:** Full-time four-year, more selective, lower transfer-in
- **Undergraduate Instructional Program:** Professions plus arts & sciences, high graduate coexistence
- **Graduate Instructional Program:** Doctoral, STEM dominant
- **Community Engagement:** Curricular Engagement & Outreach and Partnerships
History
The Clemson Agricultural College was established in November 1889, with its trustees becoming custodians of Morrill Act and Hatch Act funds made available for agricultural education and research purposes by federal legislative acts. Clemson College formally opened in July 1893 with an enrollment of 446 students and 15 faculty members under President Edwin Boone Craighead. The mission of Clemson University was to fulfill the covenant between its founder and the people of South Carolina to establish a “high seminary of learning” through its historical land-grant responsibilities of teaching, research and extended public service.

Clemson College was initially an all-male military school. It remained this way until 1955 when the change was made to “civilian” status for students, and Clemson became a coeducational institution. In 1964, the college was renamed Clemson University as the state legislature formally recognized the school’s expanded academic offerings and research pursuits (clemson.edu/about/history). In December 1999 James F. Barker, selected as Clemson's 14th President, introduced a vision for Clemson to be ranked in the top-20 of public institutions. Clemson was ranked in the third tier of public universities when President Barker assumed office; for the past five years Clemson has been ranked in the top 25 of public universities. The change in ranking occurred because of a focus on quality, the undergraduate and graduate student experience, the faculty, focused research, and a unified campus commitment to the vision and goals of the university.

Schools and Colleges
The structure of Clemson University’s schools and colleges reflects its mission statement: Colleges of Agriculture, Forestry and Life Sciences; Architecture, Arts, and Humanities; Business and Behavioral Science; Engineering and Science; and Health, Education, and Human Development; the Calhoun Honors College serves undergraduate honors students; the Graduate School administers graduate programs; the Libraries provide comprehensive information services to all members of the university community; the Emeritus College serves as an academic home to retired faculty.

Enrollment
Clemson University is a large, selective institution. For Fall 2012, total enrollment was 19,197 FTE. Of these, 15,948 were undergraduates, 1,868 were enrolled in master’s programs, and 1,381 were enrolled in doctoral programs. Clemson's enrollment includes approximately 1,100 international students from over 90 countries (clemson.edu/oirweb1/FB/factBook/CUfactbook.cgi).
**Workforce**
The university current employees include 1,325 faculty members, 299 administrators, and 2,771 staff, as well as graduate assistants, work-study students, and other student employees.

**CLEMSON UNIVERSITY CRITICAL THINKING ASSESSMENT DATA**
The Steering Committee has spent the last several months carefully reviewing assessment data the University has been collecting over many years. Several trends regarding our undergraduate students are apparent in these data. The University is admitting excellent students, increasing numbers of whom graduate from Clemson in four years. And yet our scores on nationally normed tests indicate limited evidence of growth in writing and critical thinking skills among our students over the course of their academic careers.

For example, the university receives Clemson undergraduate students’ Graduate Record Examination (GRE) scores. The average verbal score of our graduating seniors is a rather low 478.64 (range 200 – 800); the writing mean is similarly on the low side at 3.96 (range 0 – 6). (Please note that these scores and ranges are on tests taken prior to August 1, 2011. The GRE ranges are now 130-170 for verbal and quantitative reasoning and 0-6 for analytical writing.) Separately, consider the following data from the Educational Testing Service’s (ETS) Proficiency Profile testing (Appendix C):

### ETS Proficiency Classification

<table>
<thead>
<tr>
<th>Freshmen</th>
<th>Seniors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proficient</strong></td>
<td><strong>Marginal</strong></td>
</tr>
<tr>
<td><strong>Reading Level 1</strong></td>
<td>75</td>
</tr>
<tr>
<td><strong>Reading Level 2</strong></td>
<td>47</td>
</tr>
<tr>
<td><strong>Critical Thinking</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>Writing, Level 1</strong></td>
<td>76</td>
</tr>
<tr>
<td><strong>Writing, Level 2</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Writing, Level 3</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Mathematics, Level 1</strong></td>
<td>73</td>
</tr>
<tr>
<td><strong>Mathematics, Level 2</strong></td>
<td>43</td>
</tr>
<tr>
<td><strong>Mathematics, Level 3</strong></td>
<td>12</td>
</tr>
</tbody>
</table>

* A student classified as marginal is one whose test results do not provide enough evidence to classify the student either as proficient or as not proficient.
The ETS Proficiency Profile data suggest that Clemson students appear not to improve their writing skills over the course of their undergraduate careers. Reading skills improve slightly, but 23 percent of our graduating seniors are judged not to be proficient. Of even greater concern, fully 57 percent of our graduating seniors are not proficient in critical thinking. These results contrast markedly with those for quantitative skills at which Clemson students far demonstrate greater proficiency.

Moreover, the committee noticed little change in student raw scores on the ETS Proficiency Profile for seniors over the last four years (see table below). Though Clemson ranks slightly above the national average overall, Clemson students are not improving across time to the degree that they should. This raises the “value added” dimension of a Clemson education experience.

NORMED SCORES ON ETS PROFIENCY PROFILE (SENIORS)

<table>
<thead>
<tr>
<th>Competency</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking</td>
<td>115.00</td>
<td>115.42</td>
<td>114.75</td>
<td>115.30</td>
<td>112.90</td>
</tr>
<tr>
<td>Reading</td>
<td>121.44</td>
<td>121.52</td>
<td>120.96</td>
<td>121.05</td>
<td>120.10</td>
</tr>
<tr>
<td>Writing</td>
<td>116.03</td>
<td>116.36</td>
<td>116.26</td>
<td>116.31</td>
<td>115.48</td>
</tr>
<tr>
<td>Math</td>
<td>117.51</td>
<td>118.35</td>
<td>117.81</td>
<td>117.58</td>
<td>115.48</td>
</tr>
</tbody>
</table>

ePORTFOLIO FINDINGS ON GENERAL EDUCATION COMPETENCIES

Each summer, teams of faculty evaluate the artifacts of General Education competencies included in student ePortfolios (Appendix D). The most recent Communication competency review yielded a 59.7 percent pass rate and a mean score of 1.80 for content (on a scale of 1-4). Once again, our students appear to be doing work that is average or slightly above average.

In the 2011 aggregate data, critical thinking artifacts were judged most favorably, with an average score of 2.3 (scale: 1-4). The remaining competency means were: Natural Science, 2.28; Mathematical Literacy, 2.15; Science and Technology in Society, 2.07; Social Science, 1.97; Ethical Judgment, 1.71; Cross-Cultural Awareness, 1.48; and Arts and Humanities, 1.27.

Although the critical thinking competency received the highest rating in 2011, the relatively low score of 2.3 suggests improvements are needed. In addition, analysis of the artifacts suggests that students are not yet employing critical thinking skills in a way that will allow them to translate those skills to non-academic environments. Thus, in the steering committee's judgment, this relatively high score on critical thinking artifacts does not belie the need for greater emphasis on critical thinking as a part of Clemson undergraduate’s academic experience.
In 2012, 2,000 artifacts were scored by 45 faculty from the five academic colleges. The most frequently assessed artifact was critical thinking (22.7 percent). The overall 2012 score on critical thinking was 1.6. Overall, all ratings had dropped in this review session. Science and Technology received the highest average (2.1), followed by Social Science (1.8), then Critical Thinking and Natural Science and Mathematics (both at 1.6), followed by Ethical Judgment and Arts and Humanities (1.5) and Cross Cultural Awareness (1.4).

The process of the Quality Enhancement Plan had raised awareness regarding critical thinking assessment data. Following the 2012 summer review of artifacts, faculty on the Undergraduate Curriculum Committee recommended the following changes to the competency and rubric for scoring artifacts in critical thinking.

“Demonstrate the ability to assemble evidence relevant to a significant and complex issue, evaluate the quality and utility of the evidence, and use this evidence to come to a logical conclusion about the issue.” *
1. Assembles relevant evidence.
2. Assesses the quality and utility of the evidence.
3. Analyzes the evidence to reach a logical conclusion or solution.

The findings and changes in the competency, further support the focus of the QEP and the student learning outcomes identified in this document.

**ADDITIONAL SOURCES OF ASSESSMENT DATA**

Various advisory groups across campus continue to encourage the university to do a better job of preparing students to write effectively and to solve problems. Meanwhile, national-level discourse on higher education—especially the cost of a college education—has created a culture of demand for quantifiable evidence of the value added by a college degree. In short, the public is looking for “proof” that universities really do prepare graduates for jobs.

*Current competency: “Demonstrate the ability to critically analyze the quality and utility of knowledge gained throughout the undergraduate experience and apply this knowledge to a wide range of problems.”
Curricular and co-curricular engagement is one way in which a Clemson education prepares students for the workplace of the future. Our assessment data on “engaged learning” include numbers of students enrolled in Creative Inquiry, undergraduate research, service learning courses, and other learning experiences that take place outside of the traditional classroom. Fall 2011 data show that 295 students were enrolled in co-op experiences; 476 students did internships; and 1,018 studied abroad (in 2010-11). Creative Inquiry included 2,094 students and service learning involved 3,195 students.

The Steering Committee also had access to student-reported data from the National Survey of Student Engagement (NSSE). Sixty-seven percent of our seniors in 2011 said they completed an internship, practicum, field experience, or clinical experience. Seventy-six percent reported community service and volunteer work. Thirty-eight percent worked with a faculty member on a research/scholarship project, and twenty-four percent had studied abroad.

Exit surveys, alumni surveys and focus groups of Clemson students highlight the benefits of academically structured learning outside the classroom. Students say internships, co-ops, service learning, and practicums are as important as traditional classroom learning, particularly because such experiences allow them to apply their knowledge in the workplace and to build their confidence about applying for jobs.

CLEMSON UNIVERSITY’S CURRENT EFFORTS TO ENHANCE CRITICAL THINKING

In light of assessment results indicating that Clemson is not reaching its goals for student learning outcomes in critical thinking, the QEP Steering Committee examined current and recent efforts to ensure attainment of competency in Critical Thinking. These efforts include a General Education competency that is distributed over the course of the undergraduate program, our Creative Inquiry Initiative, Calhoun Honors Colloquia, Clemson’s Writing Across the Curriculum program and the Ethics Across the Curriculum program and the university’s emphasis on engaged learning for our undergraduates.

General Education
Clemson’s General Education requirements include a competency in critical thinking: “Demonstrate the ability to critically analyze the quality
and utility of knowledge gained throughout the undergraduate expe-
rience and apply this knowledge to a wide range of problems” (www.
registrar.clemson.edu/publicat/catalog/2012/gened.pdf). This compet-
tency is considered a “distributed” competency, and every curriculum
must incorporate it at multiple levels. Every degree program shows on its
“General Education Checklist” the specific courses that address critical
thinking and describes the method by which critical thinking will be as-
signed. Most degree programs have a senior-level course with specific
assignments that are used to evaluate students’ attainment of the Critical
Thinking competency. Additionally, students select work to demonstrate
their attainment of the competency, which they put in their ePortfolio
along with a rationale statement describing how the selected artifact re-
lates to the competency. These artifacts are reviewed by faculty evalua-
tors each summer (Appendix D).

Calhoun Honors Colloquia
The Calhoun Honors College offers seminars on special topics that are
reading and writing intensive. Although these seminars have not been
evaluated specifically for impact on critical thinking, examination of work
submitted by these students in ePortfolios indicates that the seminars do
result in significant intellectual engagement with the topics. Some of the features of the seminars that are consistent with research findings related to critical thinking include the use of discussion-based rather than lecture-based teaching approaches, frequent writing assignments and in-depth instructor feedback, and the use of more challenging assignments than are typically found in non-honors courses.

Creative Inquiry
Creative Inquiry is Clemson’s team-based undergraduate research initiative. Investigations are led by a faculty mentor and typically span two to four semesters. The goal of this program is for undergraduate students to have a deep research experience that more closely resembles the activities of graduate students studying under a specific professor. There are currently more than 300 active projects, with more than 2,000 students participating. At the 2012 Creative Inquiry Poster Forum, students from these projects created 186 poster presentations. Since the program’s inception, there have been 188 presentations at professional meetings and 95 publications. There are currently three patents pending that are based on work done in creative inquiry teams. Assessment results for Creative Inquiry indicate that participating increases students’ knowledge of the process of research and their confidence in problem solving (clemson.edu/academics/programs/creative-inquiry).

Writing Across the Curriculum
Clemson Thinks² is an effort to teach Critical Thinking Across the Curriculum. In this respect, we are able to draw on a record of success in analogous initiatives in Writing Across the Curriculum (WAC), instituted in the 1990s, and Ethics Across the Curriculum, instituted in the 2000s. Given that the three distributed competencies in Clemson’s general education are communication, ethics, and critical thinking, it only follows that Clemson launch an effort to teach critical thinking across the curriculum that builds on the previous successes of similar initiatives geared toward writing and ethics.

Clemson’s Writing Across the Curriculum program, housed in the Pearce Center for Professional Communication, seeks to encourage and enable faculty to incorporate writing at all levels of instruction in all academic disciplines. A core tenet of Writing Across the Curriculum is that a university education not only teaches students to learn to write but also to write to learn. That is to say, whether the class be accounting,
entomology, or chemistry, when students engage in strategic acts of writing, sometimes formal but often informal, they better learn to become cognizant of and to articulate the cognitive process and logical steps in learning the subject matter in question. In other words, a key premise of WAC programs is that students do not learn something internally and then articulate it externally; rather, (1) a student has not truly mastered a concept until she or he can articulate and communicate it; and (2) writing is not something that only occurs at the end of the process of learning but instead is a catalyst to the process of learning. Critical thinking is in large part meta-cognition, or thinking about thinking. That process necessarily requires that students articulate and communicate what they learn, know, and do. In this respect, critical thinking and writing are two sides of the same coin.

Clemson’s WAC initiative was instrumental in the university being named TIME Magazine’s Public College of the Year in 2000. In every year since, Clemson has appeared on U.S. News & World Report’s list of Best Schools for Writing in the Disciplines.

Ethics Across the Curriculum
The Ethics Across the Curriculum program of the Rutland Institute for Ethics was designed to equip faculty in any discipline to integrate ethics into their regular classes. In an annual summer seminar faculty learn how to focus attention on ethical problems in a way that forces students to think carefully about the positions they hold and why they hold them, as opposed to merely defending prior opinions without much thought. They also become familiar with some wrong moves their students will almost certainly make and techniques for handling them. These wrong moves—logicians and teachers of critical thinking would call several of them informal fallacies—are common in ethical discussions, but they are, sadly, ubiquitous. In ethics as in science, politics, or economics, for example, if one is serious about pursuing the truth, it is essential that one is able to recognize these wrong moves in written or oral argument (another’s or one’s own). So, faculty in the EAC seminar learn how to help students avoid them. Avoiding missteps isn’t enough, however. Participants in the EAC seminar become familiar with a set of tools for ethical decision-making and a framework for their use, both of which, it is hoped, they will use when engaging students in discussions of ethical issues that arise in class and constitute teachable moments. The framework directs attention to (i) identifying issues and stakeholders (taking note of how the stakes they have may differ from one another), (ii) using
the tools to analyze options and, subsequently, (iii) justify (by reasoned argument) the decision and action to be taken. In short then, RIE’s EAC program seeks to equip faculty to help students acquire/develop skill in ethical decision-making, or put another way, to help students get in the habit of thinking critically (a) about a position staked out by another and (b) in making the case for their own position.

**Student Engagement**

Clemson University has been recognized by the Carnegie Foundation for community engagement in both Curricular Engagement and in Outreach and Partnership. Clemson University’s 2020 plan includes engaged learning as a major goal. This goal includes Creative Inquiry and other undergraduate research activities, participation in Cooperative Education and internship programs, service learning, and growing and strengthening Residential Learning Communities. Clemson has been recognized for high levels of student participation in internships ([clemson.edu/media-relations/4608/clemson-ranks-high-among-universities-in-student-internships](clemson.edu/media-relations/4608/clemson-ranks-high-among-universities-in-student-internships)), with the intention to increase opportunities for students in the coming years. As we collect more ETS Proficiency Profile data on graduating seniors, we will be better able to see the impact of these experiences to increased critical thinking as a learning outcome.
VI. ACTIONS TO BE IMPLEMENTED

INTRODUCTION

Clemson Thinks2 is designed to foster sustained improvement in Clemson students’ critical thinking skills and to transform the Clemson culture in a way that places critical thinking at the center of its educational enterprise. These changes will grow primarily from the implementation of CT² Seminars across campus, many of which address General Education content and others that are disciplinary in nature. As noted above, the plan encourages faculty who teach CT² Seminars to develop a variety of pedagogical approaches. The Clemson Thinks² Implementation Team and the Clemson Thinks² Office will assess the effectiveness of these approaches and subsequently promote approaches that are most empirically successful.

The Steering Committee has specified five Student Learning Outcomes as well as a clear set of guiding principles for the implementation of Clemson Thinks². Careful thinking about existing University resources and best practices offers additional context for the launch, sustenance, and eventual growth of CT² Seminars. The implementation plan is a result of insights provided by members of the Steering Committee, the QEP literature review, and interaction with a wide range of campus entities including all of those referenced above.

CLEMSON THINKS² IMPLEMENTATION TEAM

A Clemson Thinks² Implementation Team was convened beginning in the Fall Semester of 2012. This team consists of subcommittee chairs from the Steering Committee as well as the Steering Committee’s co-chairs. Its members include faculty, staff, and representatives from Academic Affairs and other campus units that will interface with and support CT² Seminars. The team is working on logistical matters including registration requirements and procedures, seminar requirements, and necessary faculty and student resources. The Implementation Team will continue to function during the first year of the implementation of Clemson Thinks² in an advisory and transitional role.

ACTIONS TO BE IMPLEMENTED

Clemson Thinks² will be implemented in two phases: “Launching Clemson Thinks²” and “Sustaining and Growing Clemson Thinks².” Specific actions to be implemented in each phase fall into five categories: Development of CT² Seminars, Development of Infrastructure, Faculty Development, Communication, and Assessment.
Forty CT^2 Seminars will be offered during the 2013-14 Academic Year, and the number of CT^2 Seminars offered will increase by 20 percent in each subsequent academic year.

- **Development of CT^2 Seminars:** Various concrete steps must be undertaken to develop the CT^2 Seminars. This process is being aided substantially by the implementation of a small number of pilot seminars during the 2012-13 Academic Year. Moreover, the University Undergraduate Curriculum Committee will vote on formal course rubrics by May 2013 (Appendix F). Once the course rubrics are approved, specifics of the seminar proposal and approval process will be developed and refined. Forty CT^2 Seminars will be offered during the 2013-14 Academic Year, and the number of CT^2 Seminars offered will increase by 20 percent in each subsequent academic year. By 2017-2018, we hope to have grown the program sufficiently to accommodate 90 percent of second-year students at Clemson. In the longer term, the Clemson Thinks^2 program will form the basis for a proposal to transform General Education at the university.

- **Development of Infrastructure: Clemson Thinks^2** will require a full-time director. This individual, who will be an internal hire from among the ranks of tenured faculty, will assume his/her responsibilities during the 2013-14 Academic Year (Appendix H). The Director will be responsible for overseeing actions including but not limited to: recruiting faculty to teach CT^2 Seminars, coordinating the logistics of CT^2 Seminars, taking the lead on assessment and course evaluation practices, contracting outside speakers and workshop facilitators to augment the campus-wide conversation about critical thinking, organizing the annual CT^2 Faculty Institute, compiling student engagement opportunities related to critical thinking, and overseeing the Clemson Thinks^2 budget. An administrative assistant will be hired to support the Director. Supporting committees will include the aforementioned Implementation Team, which will be replaced by a more permanent Advisory Committee (consisting of select faculty, staff, and students); a CT^2 Seminar Proposal Review Committee; and an Assessment Committee.

- **Faculty Development: Clemson Thinks^2** includes an essential—and quite intentional—faculty development component for instructors. The first and most important action to be implemented will be the development of the Faculty Institute, which will take place for the first time in Summer 2013 (Appendix G). QEP Steering Committee members will be used as “test subjects” as the faculty development component of Clemson Thinks^2 moves ahead. Specifics regarding faculty compensation and incentives for faculty participation will need to be determined. Once faculty members have participated in the Faculty Institute and taught one or more CT^2 Seminars, they may be invited to play a larger, more permanent role in Clemson Thinks^2 by becoming CT^2 Scholars. Eventually, a New Faculty Development Program could take shape around teaching critical thinking. The Steering Committee also hopes that the Clemson Thinks^2 program will stimulate a collaborative research program about critical thinking pedagogy at the University.
• **Communication:** Extensive campus-wide communication is planned for the launch and sustenance of *Clemson Thinks*². The Implementation Team and the *Clemson Thinks*² Office will utilize a variety of modes of communication, including print, face-to-face meetings, and digital media. Beginning in Summer 2013, the *Clemson Thinks*² program will target new students during summer orientation and once they matriculate. Faculty will be invited to attend the *CT² Faculty Institute* and subsequently to teach *CT² Seminars*. In addition, new faculty will be informed about the *Clemson Thinks*² program at their orientation sessions. In all cases, the benefits of *Clemson Thinks*² will be highlighted in every communication with students and faculty.

• **Assessment:** Multi-dimensional assessments of critical thinking skill acquisition will occur throughout the implementation of the *Clemson Thinks*² program. Data will be drawn from pre- and post-assessment of students’ critical thinking skills using the Critical Thinking Assessment Test (CAT) developed by Tennessee Technical University, the California Critical Thinking Skills Test (CCTST) developed by Insight Assessment, and the Critical Thinking battery of the ETS Proficiency Profile Test. Assessment of best pedagogical practices will be undertaken by the QEP Office using data from these examinations broken down by individual *CT² Seminar* (thus, by instructor), as well as students’ Critical Thinking artifacts (discussed below).

• **Research:** The Quality Enhancement Plan provides a wealth of research about our students, faculty, courses, and artifacts. The university is committed to hiring two research faculty to ensure that the Quality Enhancement Plan is an experiment in critical thinking and that we make the best use of the assessment data. The university will be able to track students who participate in *CT² Seminars*; who engage in Creative Inquiry, service and community learning, cooperatives, and internships; who participate in student life activities such as living-learning communities and student government; as well as their course work, grades, and critical thinking longitudinal data. The robust and broad-based sources of measurement will provide feedback into course redesign, summer institute content and design, and promoting effective teaching strategies. The research can assist in linking the classroom to the out-of-class experiences. Research findings can support and enhance our understanding of critical thinking pedagogy. We have the opportunity to demonstrate what we teach, how our students learn, and what is most effective (Appendix I).
VII. TIMELINE

INITIAL ACTIONS: LAUNCHING CLEMSON THINKS² (SPRING 2013)
1. Development of Clemson Thinks² Seminars
2. Submission and approval of General Education CT² Courses
3. Development of administrative infrastructure
4. Faculty Development – First Faculty Institute
5. Communication matrix developed
6. Assessment strategies defined
7. Visit by SACSCOC April 2013
8. Continue CT² pilot course assessments
9. Search and select Founding Director and establish Clemson Thinks² Office
10. Launch to campus community
11. Design pilot study parameters

YEAR ONE – 2013-2014
1. Implement CT² Seminars – 10 to 40
2. Initiate student tracking system
3. Intensive data collection and evaluation of course assessment data initiated
4. Implement CT² Scholars Program
5. Recruit, implement and assessment of Faculty Institute
6. Visit and meet with various campus groups including colleges, departments, Student Government, Faculty Senate
7. Appoint a Clemson Thinks² Advisory Committee
8. Review data from pilot study and make appropriate revisions to the plan
9. Hire research faculty member and research coordinator.

YEAR TWO – 2014-2015
1. Increase CT² Seminars – 80 to 100 sections
2. Add Administrative Assistant
3. First cohort of second-year students to enroll in CT² Seminars
4. Continue Faculty Institutes
5. Travel to meetings to promote Clemson Thinks²
6. Continue evaluation and assessment of CT² Seminars
7. Review data from student and course assessments by Advisory Committee
8. Make appropriate revisions to the plan
9. Hire research faculty member
10. Work closely with and share data findings with: Undergraduate General Education Committee, ePortfolio Artifact Review, Engagement Offices, and other related committees on campus
YEAR THREE – 2015-2016
1. Increase CT² Seminars – 100 - 120 sections
2. Add Assistant Director and Research Coordinator
3. Continue all activities initiated above and make improvements based on assessment and research findings
4. Begin to share data analysis related to students – attend local and national meetings
5. Seek extramural research funds to expand the study of the relationship between CT² and engagement activities across the university

YEAR FOUR – 2016-2017
1. Increase CT² Seminars – Increase to 160 sections, 3,040 undergraduate students
2. Continue all activities initiated above and make improvements based on assessment and research findings

YEAR FIVE – 2017-2018
1. Increase CT² Seminars – Increase to 200 sections; 3,800 undergraduate students
2. Begin search for permanent Director
3. Continue all activities initiated above and make improvements based on assessment and research findings

The timeline presented above is a starting point for implementation. Throughout the process of development of the QEP, ideas and plans have emerged and been accepted, modified, or discarded (Appendix J). The assessment and findings will be used throughout the project to update and modify the timeline and activities.
VIII. ORGANIZATIONAL STRUCTURE

CLEMSON THINKS² ADMINISTRATION
The Clemson Thinks² program will be administratively housed in the Office of the Vice President for Academic Affairs, within the Office of Undergraduate Studies. Initial staffing for the program will consist of a program director and an administrative assistant. The program's Founding Director will be selected from among tenured faculty and will lead efforts to recruit faculty for the initial launch of the seminars and will develop plans for the ongoing recruitment of faculty. The director will identify and partner with campus offices to support Clemson Thinks² and will have oversight of the budget. The director will also provide leadership for evaluation and assessment of the seminars for continual improvement. The director will report to the Vice Provost and Dean of Undergraduate Studies. The director will manage the day-to-day operation of the office. He or she will also work with the appropriate campus offices on course scheduling. The director will develop and maintain campus-wide distribution of information about the courses and will provide assistance to and support for faculty instructors. An administrative assistant will provide the necessary support for the director.

SUPPORTING COMMITTEES
The Implementation Team comprised of faculty, staff, and representatives from Academic Affairs and campus units that interface with and support the seminars will continue to function during the first year of the program’s implementation. An Advisory Committee will be established to provide input and guidance for the program. A Faculty Proposal Review Committee will be formed to review and recommend approval of Clemson Thinks² proposals. In addition, existing faculty and student committees and boards will also provide input and guidance to sustain the Clemson Thinks² program; for example, the Teaching with Technology Committee of the Office for Teaching Effectiveness and Innovation will provide input and counsel related to Clemson Thinks² faculty instructional support. Student groups such as the Academic Affairs Committee of the Undergraduate Student Senate will be consulted each semester for input and to gain students’ perspectives. A description of the Implementation Team and the supporting committees follows.

IMPLEMENTATION TEAM
The Implementation Team is comprised of faculty, staff, and representatives from Academic Affairs...
and campus units that interface with and support the seminars. This team provides valuable input on matters such as registration requirements and procedures, seminar requirements and how to implement them, and identification of necessary faculty and student resources. The Implementation Team will continue to function during the first year of the program’s implementation and provide input to the director.

**CLEMSON UNIVERSITY CT² ORGANIZATIONAL STRUCTURE**

The advisory committee will consist of faculty and students who will advise on issues pertinent to the on-going development, implementation, and assessment of the seminar courses and program. Members will also provide valuable input on student and faculty feedback and concerns.

**FACULTY PROPOSAL REVIEW COMMITTEE**

A faculty group will be named to review course proposals on a rolling basis. This committee will be responsible for closely examining proposals to ensure that they address the goals of the seminars and include the required seminar elements.

**CLEMSON THINKS² ADVISORY COMMITTEE**

The *Clemson Thinks²* Advisory Committee will play an important role in the development and implementation of the various programs and activities of *Clemson Thinks²*. The committee will consist of faculty members appointed by the Provost based on demonstrated success in fostering students’ critical thinking skills and scholarship associated with critical thinking. It is anticipated that *Clemson Thinks²* will also offer one or more teaching awards to recognize faculty and graduate students who are demonstrating excellence in critical thinking pedagogy. *Clemson Thinks²* Advisory Committee will screen nominees for these awards. The *Clemson Thinks²* Advisory Committee will also provide expertise and support for guiding the development of faculty teaching the seminars.

**UNIVERSITY UNDERGRADUATE CURRICULUM COMMITTEE**

The University Undergraduate Curriculum Committee, one of the standing committees of the Faculty Senate, is responsible for developing curriculum policies and procedures for Clemson University; reviewing proposed degrees, majors, minors, new courses, and course changes; and handling other matters related to curriculum. The *Clemson Thinks²* program leadership will consult with the UUCC on issues related to the seminars and university requirements.
UNDERGRADUATE STUDENT GOVERNMENT

In addition to serving as the governing body of the student population, Student Government also participates heavily in the daily affairs of the university through interaction with university officials and representation on university committees and councils. Student Government representatives provide continuous input to the administration and offer many recommendations with regard to student sentiment. Student Government also provides a wide array of services and programs for the benefit of all Clemson students, from the Homecoming Pageant in the Fall to Campus Sweep in the Spring. Every Clemson student is represented through the elected and appointed members of the Executive, Legislative, and Judicial Branches of Student Government, and those representatives welcome and encourage visits from students who wish to voice their ideas, opinions, and concerns. As the chief student advocate on campus, Student Government is dedicated to the service of all Clemson students and the enhancement of the Clemson experience. Undergraduates are also involved in the university at the college and department level. All colleges and many departments have student advisory boards whose members provide direct input to deans, department chairs, and the faculty. The active student input is the most vital ingredient in the functioning of the Clemson University Student Government. Regular communication with this group and feedback from students will be essential to the success of Clemson Thinks².
## IX. RESOURCES

### BUDGET PROPOSAL FOR QEP

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### OTHER RELATED FUNDED ACTIVITIES

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X. ASSESSMENT

ASSESSMENT OF CLEMSON THINKS²
Assessment is integral to the success of the Clemson Thinks². Indeed, it was the analysis of assessment data that enabled the University to identify critical thinking skills as an area in need of improvement and thus to formulate the plan for Clemson Thinks². Early in the process the Steering Committee determined that the plan should be informed, nimble, and designed to accommodate continuous review and revision. The assessment plan is designed with multiple sources of measurement/ evidence taken at multiple points. The plan incorporates a central body, the Clemson Thinks² Assessment Committee, to coordinate all assessment activities related to the QEP.

CRITICAL THINKING TESTS
The assessment model for the CT² Seminars is based on multiple sources of data collection. One of the most important data collection methods is the pre- and post-testing of students enrolled in the CT² Seminars. The students are tested during the first week of class and again during the final week. Based on our research, we determined that two instruments: The Critical Thinking Assessment Test (CAT) developed by Tennessee Technical University and the California Critical Thinking Skills Test (CCTST) developed by Insight Assessment were best suited to our needs.

Clemson University administered the CAT test to half the pilot courses in the fall semester of 2012 and the California test to the other half. We are following this same procedure for the pilot courses during the spring 2013 semester. During summer 2013, we will compare our results in: ease of administration, ease of scoring, quality of data, amenability to students, faculty buy-in, and other factors to determine a final assessment for the course.

ETS PROFICIENCY PROFILE
The administration of the ETS Proficiency Profile will provide insight into the long-term effectiveness of the CT² Seminars. ETS Proficiency profile has been used by the university since 2007 to assess general education competencies. Randomized samples of freshmen and seniors were tested. Beginning in fall 2011, Clemson University began administering the ETS Proficiency profile to all incoming freshmen. In concert with the establishment of the Clemson Thinks², we will begin testing all seniors with the class of 2015. This assessment will provide us with “bookends” to measure, particularly with respect to Clemson Thinks², critical thinking and communication skills. Since the students are required to provide their names and student ID numbers on the ETS Proficiency Profile, we will be able to do a longitudinal tracking of individual students. When correlated with the critical thinking tests in the CT² Seminars and the critical thinking artifacts, described below, we will gain insight into the effectiveness of different classes and methods of teaching as well as the
synergies they have in other areas of the curriculum. For example, we can assess empirically whether students who take a CT² Seminar are better prepared for engagement activities and vice-versa, or whether students who do both a CT² Seminar and service learning have higher overall gains in critical thinking ability.

CRITICAL THINKING ARTIFACTS
Students enrolled in CT² Seminars will be required to assemble artifacts demonstrating critical thinking skills. These artifacts will be collected at various points in the semester and may span a variety of modalities: written documents, audio and video files, artwork, etc. Artifacts should be associated with the three critical thinking student learning outcomes and may also include a reflective essay designed to demonstrate meta-cognitive abilities.

The Clemson Thinks² Assessment Committee will review and score a sample of the artifacts each semester. This committee will coordinate with representatives of Clemson’s ePortfolio program to determine the suitability of particular artifacts for students’ ePortfolios and to establish best practices in evaluating artifacts. CT² artifacts will provide a baseline submission for ePortfolio documentation.

CLEMSON THINKS² ASSESSMENT COMMITTEE
Clemson Thinks² is designed to be in a cycle of continuous monitoring and quality improvement. Central to this will be the Clemson Thinks² Assessment Committee. In constituting this committee, the Director of Clemson Thinks² will draw on various members of the university community. The committee will coordinate with the Office of Institutional Effectiveness and the University Assessment Committee in order to ensure the establishment and observance of best practices in the collection, evaluation, and use of assessment data as well as the review and revision of the assessment plan.

The committee will meet regularly in order to execute its charge: to analyze all data collected pertinent to Clemson Thinks² and to formulate and implement improvements based on the data. The committee is also responsible for the coordination of all tests and surveys pertaining to Clemson Thinks². The primary sources of data will be the critical thinking pre- and post-tests, the critical thinking artifact collections, and Student Evaluations of Instructors. Additional data will be gathered from focus groups of students and instructors and class observation.
In addition, the Assessment Committee will review a sample of Critical Thinking artifacts each semester, employing the same rubric utilized by the instructors. The committee results will be compared to those of the instructors and strengths and weaknesses will be identified. This information will be correlated with the critical thinking tests and other sources of evidence discussed above. The assessment process for the Clemson Thinks\textsuperscript{2} will be robust and broad-based with multiple sources of measurement and evidence. The data results will be used in redesigning the faculty institute, the overall CT\textsuperscript{2} program, and research design.

\textbf{CT2 RESEARCH}

The design of Clemson Thinks\textsuperscript{2} is unique in that its systematic approach to assessing what actually works in the classroom will result in a dataset of unique size and quality. By analyzing these data, we will be able to develop evidence-based answers to what is presently unclear: how best to instill critical thinking skills in students across an entire university. The collection of these data will position Clemson to take the lead in research on an issue of vital importance.

Within five years, Clemson Thinks\textsuperscript{2} will assess something on the order of 300 different classes taught by 100 different faculty and touching thousands of students drawn from every discipline on campus. Since we are also the only university (according to ETS) to test every entering freshman and graduating senior with the ETS Proficiency, which contains a critical thinking component, we will also have control data showing how the critical thinking abilities of our students evolved over the course of their college careers (whether or not they completed a CT\textsuperscript{2} Seminar). In short, we will be investing the time, effort, and funding to carry out the analytical research the problem demands but that the field currently lacks.

By analyzing these data, we will be able to develop evidence-based answers to what is presently unclear: how best to instill critical thinking skills in students across an entire university.
In order to make best use of the data, the budget includes funding for two full-time researchers: one with expertise in metacognition and the other with a focus on pedagogical innovation. Together these researchers will work with Clemson’s cohort of CT² Scholars to design classroom experiments, create the dataset, mine the data for useful conclusions, and disseminate Clemson’s findings. With two dedicated researchers, plus their attendant graduate students and postdoctoral fellows, *Clemson Thinks²* will have a research team capable of creating a unique and comprehensive source of data on critical thinking pedagogy. The connections between critical thinking and engagement activities will be a key component of the research arm of the Quality Enhancement Plan. The Clemson model, if successful, has significant potential to influence what we know and the way we think about the teaching, learning, and assessment of critical thinking in higher education.
XI. CONCLUSION

Having solicited input from the campus community, analyzed existing assessment data, and reviewed the relevant literature, Clemson University now looks forward to review of its QEP by SACSCOC, discussions with SACSCOC onsite team members about the plan, and eventual implementation of *Clemson Thinks*². We present this plan with a shared sense of enthusiasm. That sense is based on broad-based input from staff, students, and faculty; a careful and thorough planning process; and a strong commitment of support from the university administration.

More than anything, however, our enthusiasm stems from the promise that *Clemson Thinks*² holds for transforming teaching and learning at Clemson. Critical thinking is a concept often discussed but seldom defined, often assumed but seldom understood, and often desired but seldom instituted. *Clemson Thinks*² seeks to define, understand, and institute critical thinking by challenging faculty and students to work intentionally and collaboratively in order to improve the teaching and learning across the university.
XII. WORKS CITED


Higgins, Steven, Elaine Hall, Vivienne Baumfield, and David Moseley. 2005 “A meta-analysis of the impact of the implementation of thinking skills approaches on pupils” project report. London: University of London EPPI-Centre, Social Science Research Unit.


XIII. APPENDICES

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B. 2020 Road Map
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   b. 2012
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   b. CT² Seminar—Arts and Humanities (Literature)
   c. CT² Seminar—Arts and Humanities (Non-Literature)
   d. CT² Seminar—Cross Cultural Awareness
   e. CT² Seminar—Math & Natural Science
   f. CT² Seminar—Social Science (General)
   g. CT² Seminar—Social Science (Global Challenges)
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G. Clemson Thinks² Faculty Institute
H. Founding Director Job Position
I. Strategic Research Hires
J. Timeline and Changes Throughout the Process
Appendix A
Quality Enhancement Plan Steering Committee Membership

College of Engineering and Science
William Pennington, Ph.D.
Professor, Chemistry
Chair, Town Hall Subcommittee
Leidy Klotz, Ph.D.
Professor, Civil Engineering
Chair, Critical Thinking Seminar Subcommittee

College of Business and Behavioral Science
Ellen Granberg, Ph.D.
Professor, Sociology
James Gaubert, MBA
Senior Lecturer, Marketing
Laura Olson, Ph.D.
Professor, Political Science
Chair, Literature Review and Best Practices Subcommittee

College of Architecture, Arts and Humanities
Mary Beth McCubbin, M.L.A.
Lecturer, Landscape Architecture
David Hartmann, M.F.A.
Chair, Performing Arts
Professor, Theatre
Michael LeMahieu, Ph.D.
Professor, English
Chair, Editors Subcommittee

College of Health, Education and Human Development
Windsor Sherrill, Ph.D.
Professor, Public Health Science
Chair, Professional Development Subcommittee
Francis McGuire, Ph.D.
Alumni Distinguished Professor Emeritus, Parks, Recreation and Tourism Management

Eugene T. Moore School of Education
Roy Jones, Ph.D.
Executive Director, Call Me MISTER Program

College of Agriculture, Forestry and Life Sciences
Kirby Player, M.S.
Director, College Relations
David Tonkyn, Ph.D.
Professor, Biological Sciences
William Surver, Ph.D.
Professor, Biological Sciences
Chair, QEP Steering Committee and Chair, Implementation Subcommittee

Undergraduate Studies
Barbara Speziale, Ph.D.
Professor and Associate Dean, Undergraduate Studies
Verna Howell, M.A.Ed.
Associate Vice President, Student Affairs and Interim Dean of Students
Kathy Hobgood, M.S.Ed.
Director, Residential Life

Public Service Alliance
Kathy Woodard, M.P.A.
Coordinator, Service Alliance
Chair, Student Engagement Subcommittee

Board of Trustees
Allen Wood, AIA
Trustee Emeritus

Advancement
Neill Cameron, MBA
Vice President, Advancement

Clemson University Libraries
Eric Shoaf, M.L.I.S., M.P.A.
Associate Dean, Administrative Services and Librarian

Faculty Senate president-elect
Kelly Smith, Ph.D.
Professor, Philosophy and Religion

Co-Chair
Debra Jackson, Ph.D.
Assistant to the President and Vice Provost, Academic Affairs (Co-chair, QEP Steering Committee)

Students
Anna Eskridge, M.A.
Graduate Student Government President
Erin McCave, B.S.
Graduate Student
McKee Thomason
Undergraduate Student Body President
Joey Maxwell
Undergraduate Student Representative
Perry Austin
Undergraduate Student Representative
Carlisle Kennedy
Former Undergraduate Student Body President

Ex-officio
Dori Helms, Ph.D.
Vice President, Academic Affairs and Provost
Janice Murdoch, Ph.D.
Dean, Undergraduate Studies
Karen Burg, Ph.D.
Interim Vice Provost and Interim Dean, Graduate School
David Knox, Ph.D.
Director, Institutional Assessment
John Cooper, M.S.
Office for Institutional Assessment Research Associate
Jim Fatzinger, Ph.D.
Visiting ACE Fellow
Teresa Henry
Office for Institutional Effectiveness Administrative Support, QEP Steering Committee
Aija Seflic
Office for Institutional Effectiveness Administrative Support, QEP Steering Committee
APPENDIX B

The Clemson 2020 Road Map

Vision
Clemson will be one of the nation’s top-20 public universities.

Goals
Fulfill Clemson’s responsibility to students and the state of South Carolina ...

• to provide talent for the new economy by recruiting and retaining outstanding students and faculty and providing an exceptional educational experience grounded in engagement;

• to drive innovation, through research and service, that stimulates economic growth, creates jobs and solves problems;

• to serve the public good by focusing on emphasis areas that address some of the great challenges of the 21st century — national priorities such as health, energy, transportation and sustainable environment.

Objectives
Invest in four strategic priorities:

• Enhance student quality and performance

• Provide engagement and leadership opportunities for all students

• Attract, retain and reward top people

• Build to compete — facilities, infrastructure and technology
Building Blocks of a 10-Year Plan — Investments, Divestments, New Revenues

Four Critical Investments

1. Enhance student quality and performance

Not surprisingly, the list of investment priorities starts with students. Clemson will focus more aggressively on strategic enrollment management to recruit and retain a top-15 caliber freshman class.

That doesn’t mean recruiting just the best and brightest. Clemson plans to increase the diversity of the undergraduate student body and enroll more students — graduate and undergraduate — who are interested in energy, environment, transportation, health and other focus areas. And while this is not a plan to increase overall enrollment, it will leverage capacity for strategic growth, which varies by major and department.

To help recruit top students, Clemson will offer more competitive scholarships and graduate stipends, provide support services that increase retention and graduation rates, and create more opportunities for students to compete for national awards and make presentations at national meetings.

2. Provide engagement and leadership opportunities for all students

Providing every student with a real-world, problem-solving, creative engagement or leadership opportunity is a core concept of the 2020 Road Map. The 21st century economy and society demand graduates who are well-schooled in a discipline but also creative and entrepreneurial — graduates who are prepared to start a career with an established company or launch their own business.

This means increasing participation in existing programs — such as Creative Inquiry, service-learning, living-learning communities and study abroad — and creating new programs, such as internal "co-op" and internship opportunities at Clemson locations on campus and across the state.

It means nurturing creativity, critical thinking, communications capabilities, and ethical judgment and entrepreneurial skills.

It means using the campus — from the central steam plant to the adjacent experimental forest — as a laboratory, and giving students professional-level work experiences running the university machine.

It also means adopting new ways of teaching, creating a culture that values engagement, rewarding faculty and staff for these initiatives, and providing academic credit for rigorous engagement activities.

3. Attract, retain and reward top people

Competitive Compensation

The sentiment in many states since the beginning of the recession has been to cut positions and compensation, but Clemson plans to invest in people — strategically and based on performance and contributions to the bottom line. A compensation strategy developed with counsel from faculty and staff leaders will provide

- “bottom-line bonuses” to provide incentives for people to generate revenue and cut costs;
- bonuses for significant external recognition, such as National Science Foundation CAREER Awards;
- raises for top faculty and staff, based on market data and performance evaluations;
- evaluation of staff development program participation and results.

Guidelines and a funding pool for performance-based raises and bonuses will be established on an annual basis.
Research Faculty and Endowed Chairs
Recruiting more outstanding faculty will allow Clemson to continue generating the innovations that stimulate economic growth, create jobs and solve major problems facing society.

Searches will get under way this fall to fill seven prestigious endowed chairs funded through the S.C. Centers of Economic Excellence (CoEE) program. Established by the state Legislature and funded with lottery revenue, the CoEE is a challenge-grant program that funds endowments for research centers in knowledge-intensive economic clusters, such as biotechnology, automotive engineering and advanced materials. Universities must raise non-state, dollar-for-dollar matching funds to earn the state match. To date, the program has provided $45 million to Clemson for support of 16 endowed chairs in 13 Centers of Economic Excellence.

While maintaining support for strong programs in all eight emphasis areas, Clemson will add approximately 80 research faculty or teams over the next five years in areas that align with state economic development and national priorities, specifically

- sustainable environment: wind resources, water resources, power systems, energy/green campus
- health/biomedical and biotechnology: biomedical engineering, molecular/infectious diseases, smart hospitals, food systems, functional genomics, translational animal medicine
- transportation: Deep Orange, systems engineering, mechanical/automotive design, sustainable infrastructure
- advanced materials: optoelectronics, metals, polymers/composites
- information technology: high-performance computing, cyber-infrastructure, human-centered computing

“Champions”
Successes at the Clemson University International Center for Automotive Research (CU-ICAR) and Clemson University Restoration Institute (CURI) innovation campuses demonstrate the value of having dedicated, focused leaders for high-profile, critical University initiatives. Over the next five years, similar “champions” will be identified to ensure the success of large economic development projects, major revenue opportunities and mission-critical programs such as summer programs, distance and online education, student engagement and economic development projects.
4. Build to compete — facilities, infrastructure and technology

With no state capital bond bill for higher education in a dozen years, 75 percent of academic and administrative space with an average age of 49 years, a $230 million deferred maintenance backlog and an aging utility system, Clemson must make substantial capital investments over the next decade. In addition to fixing what’s broken, the plan will provide the type of academic, research, student life and athletics facilities needed to attract top faculty and students and help them be nationally competitive and deliver expected results.

The majority of projects in the plan can be funded with existing debt capacity, private gifts and generated revenues. The plan also rewards entrepreneurialism: If a department can generate its own revenues to fund a facility project, it can move to the head of the line.

Facilities, infrastructure and technology priorities over the next five years

- Complete major projects currently under way — a new home for the Academic Success Center, a life sciences complex, and renovations and addition to Lee Hall, which houses Clemson’s highly regarded architecture program.
- Double annual expenditures for maintenance, routine renovations and repairs.
- Complete phase 1 of utility system upgrade, including elimination of coal.
- Complete major HVAC and air-quality projects in high-use buildings (Daniel, Lehotsky, Poole, Martin, Barnett and Sikes).
- Enhance teaching and research facilities:
  - Engineering and science building
  - CURI graduate education center
  - Freeman Hall renovation
  - Sirrine Hall renovation
  - Charleston Architecture Center
  - Flexible lab research space and equipment
- Expand and enhance student housing and student life facilities — complete phase 1 of the housing master plan (Douthit Hills, core campus development, Greek Village, additional student recreation facilities). Completion of the housing master plan will require regulatory changes to allow for private developments on campus.
- Expand and enhance athletics facilities — a $50 million commitment that will enhance the experience for student athletes and fans and create a dramatic new entrance to campus. Priorities include an indoor football practice facility, a new pedestrian bridge and plaza to enhance safety and access to soccer and tennis facilities, and upgrades to Kingsmore baseball stadium and Littlejohn Coliseum.
- Provide support systems that reduce transactions costs and increase productivity, including a new student information system and enhanced business systems.
- Increase the number and quality of technology-enhanced classrooms and conference facilities.
- Enhance digital library resources and technology.
### APPENDIX C
Clemson University ETS® Proficiency Profile
Summary of Scaled Scores and Proficiency Levels 2007-2012

**Freshmen Fall 2007 – Fall 2012 Summary of Scaled Score**

Number of students included in these statistics: 9331

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<th>Standard Deviation</th>
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**Skills Subscores:**

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**Context-Based Subscores:**

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**Freshmen Fall 2007 – Fall 2012 Summary of Proficiency Classifications**

Number of students included in these statistics: 5996

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### Seniors Spring 2008 – Spring 2012 Summary of Scaled Scores

**Number of students included in these statistics:** 3158

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### Seniors Spring 2008 – Spring 2012 Summary of Proficiency Classifications

**Number of students included in these statistics:** 3158

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APPENDIX D
e-Portfolio Report Of 2011
Executive Summary

PURPOSE:

This report provides evaluation data from the 4th Annual ePortfolio Summer Assessment conducted summer 2011. This report includes faculty scores of the student artifacts and faculty recommendations on how to help students better understand and subsequently demonstrate their understanding of these competencies. The faculty evaluation process was intended to provide insight on the quality of student artifacts tagged to Clemson’s general education competencies, as well as the clarity of the scoring rubrics. In addition, suggestions on how to better support students in the ePortfolio development process, how to educate faculty on the ePortfolio Program and how to strengthen the ePortfolio Program were sought from the faculty evaluators.

METHOD:

Student artifacts for the 8 competencies were examined and scored by 19 faculty evaluators across the university. This process occurred over the period of one week during the college summer session. Over 800 artifacts were scored for content and communication.

KEY FINDINGS:

- The most sampled artifacts came from the College of Business and Behavioral Science (COBBS). Artifacts from COBBS represented 28.4% of the entire sample. The next highest group of artifacts came from the College of Engineering and Science (CES) (22.2%).

- The most frequently assessed competency was Social Science (SS), representing 19.3% of the total number of artifacts evaluated. Only 8.1% of all the artifacts that were examined represented the Natural Sciences competency (NS), making this the least represented competency in this assessment.

- Critical Thinking (CT) received the highest average overall score of 2.30 across colleges, which was closely followed by Natural Sciences (NS) (2.28). The average scores for Mathematical Literacy (M) was 2.15, Science and Technology in Society (STS) 2.07, Social Sciences 1.97, Ethical Judgment 1.71, Cross Cultural Awareness 1.48 and Arts and Humanities 1.27.

- Critical Thinking also received the highest score of all competency groups in the College of Business and Behavioral Sciences (COBBS) and Health, Education and Human Development (HEHD) (2.07 and 3.30 respectively).

- Across competencies, approximately 34.3% of all artifacts scored I/A (N = 559), the highest frequency of IAs were found for Cross Cultural Awareness (CC) with 47.5% (N = 47), and the lowest number of IAs being found for CT (11.2%, N = 11). Artifacts are given a score of I/A when the artifact cannot be accessed because of a broken link; when the artifact is misplaced (meaning it does not work for the competency to which it was tagged, but would work elsewhere); or the artifact has no connection to the competency.

- Across competencies, approximately 8.8% of all artifacts scored a 3 or above. Individually, the highest frequency of 4s were scored in the CT competency (17.4%, N = 17), and the lowest was found in Social Science (SS) (0.7%, N = 1). No artifacts submitted for AH scored a 4.

- Score Dimensions:
  - Overall, across all colleges and competencies, 56.7% (N = 432) of all artifacts received a passing score on the Communication dimension of the assessment. Of the artifacts created in the student’s senior year 59.7% (N = 138) received passing scores on communication.
Overall, across all colleges and competencies, 29.2% (N = 254) of all artifacts scored an IA in Content dimension of scores. This was closely followed by scores of 1 (28.4%, N = 247), 2 (26.2%, N = 228) and 3 (12.2%, N = 106). Four percent (N = 36) of all artifacts scored a 4 in content. The average overall score on content is 1.89 (IAs are excluded).

1 Scores refer to content unless otherwise indicated.
2 All scores are on a 5-point scale, including 0(IAs); however, IA is excluded from this analysis.

The scores for communication exclude Arts and Humanities.

e-Portfolio Report Of 2012
Executive Summary

PURPOSE:
This report provides evaluation data from the 5th Annual ePortfolio Summer Assessment conducted summer 2012. This report includes faculty scores of the student artifacts and faculty recommendations on how to help students better understand and subsequently demonstrate their understanding of these competencies. The faculty evaluation process was intended to provide insight on the quality of student artifacts tagged to Clemson’s general education competencies, as well as the clarity of the scoring rubrics. In addition, suggestions on how to better support students in the ePortfolio development process, how to educate faculty on the ePortfolio Program and how to strengthen the ePortfolio Program were sought from the faculty evaluators.

METHOD:
Student artifacts for the 8 competencies were examined and scored by 45 faculty evaluators across the university. This process occurred over the period of one week during the college summer session. Over 2000 artifacts were scored for content and communication.

KEY FINDINGS:

- The most sampled artifacts came from the College of Agriculture Forestry and Life Sciences (CAFLS). Artifacts from CAFLS represented 23.4% of the entire sample. The next highest group of artifacts came from the College of Engineering and Science (CES) (21.8%).

- The most frequently assessed competency was Critical Thinking (CT), representing 22.7% of the total number of artifacts evaluated. Only 6.2% of all the artifacts that were examined represented the Cross Cultural Awareness competency (CC), making this the least represented competency in this assessment.

- Science and Technology in Society (STS) received the highest average overall score of 2.1 across colleges, which was followed by Social Sciences (SS) (1.8). The average scores for Natural Science (NS), Mathematics (MA) and Critical Thinking were 1.6, while the average scores for Ethical Judgment (EJ) and Arts and Humanities (AH) were 1.5, and Cross Cultural Awareness 1.4.

- Science and Technology in Society (STS) also received the highest score of all competency groups in the College of Engineering and Science (CES), College of Agriculture Forestry and Life Sciences (CAFLS), and College of Health, Education and Human Development (HEHD) (2.64, 2.38, and 2.18 respectively). Social Sciences received the highest score of all competency groups in the College of Business and Behavioral Science (COBBS) (2.04) while Cross Cultural Awareness (CC) received the highest score in the College of Architecture, Arts and Humanities (AAH) (1.67).

- Across competencies, approximately 57.1% of all artifacts scored 1 (N = 665), the highest percentage of 1s were found for Cross Cultural Awareness (CC) with 73% (N = 53), and the lowest number of IAs being found for SS (33%, N = 27). Artifacts are given a score of 1 for a variety of reasons which are competency specific. See Appendix 1 for a description of these reasons.
• Across competencies, approximately 14% (N = 159) of all artifacts scored a 3 or above.
• Score Dimensions:
  o Overall, across all colleges and competencies, 57.5% (N = 478) of all artifacts received a passing score on the Communication dimension of the assessment,
  o Overall, across all colleges and competencies, 57.1% (N = 665) of all artifacts scored a 1 in content dimension of scores. This was closely followed by scores of 2 (29.5%, N = 344) and 3 (10.7%, N = 125). Three percent (N = 34) of all artifacts scored a 4 in content. The average overall score on content was 1.6.

\(^1\) Scores refer to content unless otherwise indicated.
\(^2\) All scores are on a 4-point scale.
APPENDIX E
Town Hall Meetings Overview

Three “town hall” meetings were held at the end of the spring 2012 semester to gather input from faculty and staff on the QEP. These were held in the Madren Center on the following dates: May 9th, May 22nd, and June 4th. All meetings were held in the early evening, and light refreshments were served. The first meeting was limited to faculty, and the latter two were open to all faculty and staff. The format was informal, with open discussion of all participant questions. Attendance was quite good, ranging from ~20 at the first meeting to ~50 at the last two.

Many excellent ideas were generated from these discussions, and the QEP was accordingly modified to address the concerns of the faculty and staff. An FAQ list was generated, along with answers. It should be pointed out that the answers take into account the concerns of the faculty – i.e., they aren’t a response to the participants, but represent an acceptable approach based on the discussion in these meetings.

FAQ: How are we going to do this for students in a major with very few free electives?
This should not increase the burden on your students as they can fulfill this requirement either by taking a general education course which meets it or, if your department chooses to offer them, major courses which do.

FAQ: Is this going to be a single, “one size fits all” sort of course?
During the pilot phase, no. We are trying to be as flexible as possible for the first two years to see just what works at Clemson. However, if that data suggest strongly that some approaches work better than others, then this will be factored into the requirements for a course once the plan is fully implemented.

FAQ: Are faculty or departments going to be forced to teach these courses?
No. There will be incentives both for faculty and departments to teach these courses, but if you choose not to do so, you will not be forced.

FAQ: Will there be adequate resources to do this correctly?
This is still being negotiated, but the administration has taken the position that, if we are doing to do this, then we should do it correctly.500They realize that this ultimately means a significant investment of resources and signs are excellent that we can make that happen. If that changes, then the QEP will also have to change.

FAQ: You promise resources to provide incentives, but how do we know these promises will be kept over time?
We realize there is a lot of faculty distrust on this issue. We expect President Barker to make a clear public statement about the importance of this project and its funding. If you are still unconvinced, then consider this: Clemson has to give a detailed implementation plan to SACSCOC and, once this is done, we cannot really back down.

FAQ: Will these courses be taught by anyone other than tenure track faculty?
Perhaps. We are very optimistic that, with the incentives provided, we will have enough tenure track volunteers to staff all the sections we will need. If not, however, we will have to explore other instructional resources in a way that still maintains the quality of the student experience.

FAQ: Isn’t this another top down proposal?
It’s required by SACSCOC, so we would not have this if not for that requirement. However, the committee is a very broad collection of faculty that has been, and continues to be, very open to input from outside. The committee has not been pushed in any particular direction by the administration, other than what is required by SACSCOC.

FAQ: Do we have to do this?
We have to have a QEP. This is a core requirement for SACSCOC accreditation, without which Clemson would lose our qualification to handle any federal monies, both research funds and student loans. We did not have to do this particular QEP, but this is the plan the committee has decided upon after examining 21 proposals over a nine month period. At this point, we can still modify aspect of the plan, but we cannot start over again from scratch.

FAQ: Will departments be able to teach courses for their own majors which count?
Yes. Any course can count as a sophomore seminar, as longs as it fulfills the requirements.
FAQ: What evidence do you have that we aren’t already doing a good job teaching critical thinking?
We have faculty input that they teach critical thinking in their courses, but the literature tells us that this does not always hold true. Anecdotal reports from faculty and students indicate we do a great job in critical thinking. We have ETS Proficiency Profile scores of our students; and they are above average as freshmen, and above average as seniors, but no proof that their time with us has made a difference. We have artifact reviews from ePortfolio and faculty reviews are just okay, and the change from 2011 to 2012 shows a drop from 2.3 to 1.6 in critical thinking artifacts.

FAQ: What evidence do you have that critical thinking can be changed at all?
The literature strongly suggests that with intentional instruction you can increase critical thinking skills.

FAQ: What evidence do you have that a single class or specific methodologies within a single class can have a significant impact on critical thinking?
To some extent, this is the whole point of the two-year pilot phase. However, there is evidence that a single class can, if designed properly, have a significant impact. For example, a multidisciplinary general education course, Foundations of Science, was developed to improve students’ critical thinking and scientific literacy at Sam Houston State University. The course is taught collaboratively by faculty in Geography/Geology and Biology. It was evaluated using the Critical Assessment Test (CAT), a new instrument being developed by the National Science Foundation. Taking this one course produced as much change in students’ critical thinking ability is typically seen in a full four years of college. (see www.tntech.edu/cat/links-to-successful-projects/)

FAQ: How will improvement in critical thinking be measured? Can we trust the metric?
We need to determine how best to assess critical thinking during the pilot phase, but we will probably use multiple methods. There are many options: ETS is a multiple-choice instrument approved by the federal government and for which we have lots of longitudinal data. The CAT is being developed by the National Science Foundation and allows students to write free responses to critical thinking challenges, which are then graded by trained faculty.

FAQ: Will this involve changes to general education?
Not during the pilot phase, though it’s possible we will want to recommend changes after this is completed. If we do, we will have to work with the University Curriculum Committee and others to figure out what we wish to change and make that happen.

FAQ: Won’t this endanger creative inquiry?
No, in fact it may help CI. There is no plan to “steal funding” from CI and this seems unlikely given the success of the program. We will assess CI classes as a means of fostering critical thinking and, if they do this effectively, then we may be able to find a way to further incentivize the teaching of CI over the current system. At worse, though, the two programs will run in parallel.

FAQ: Why can’t we just use creative inquiry for our QEP?
We understand that many people love CI and would prefer to see an enriched CI as our QEP. The committee did consider this, along with many other proposals from faculty, and ultimately decided to go in a different direction. We hope, however, that a successful sophomore seminar program can be used as a means to better prepare our students to take full advantage of engagement activities like CI, service learning, study abroad, etc.

FAQ: Could a department do something which is woven throughout the curriculum, not taught in a single course?
Perhaps. During the pilot phase, we want to be open to interesting, “non-standard” methods for delivering the critical thinking experience. For example, PRTM has a new “immersion experience” which might work very well here. However, this will have to be decided on a case-by-case basis, and ultimately will be driven by the data on the effectiveness of the program in fostering critical thinking.

FAQ: What must faculty stop doing in order to do this?
Nothing. First, this is strictly voluntary, so if you are too busy to do it, then you don’t have to. Second, if you do choose to do it, teaching these courses will count as part of your regular load (unlike creative inquiry).
FAQ: How can something like this really work in the culture we have now where teaching is just not valued? Many of us agree that our current culture is a problem and are working to change it. However, we cannot oppose any curricular innovation that comes along, especially one required by SACSCOC, simply because we have work to do to improve the teaching climate.

FAQ: What is the timeline for implementation? A five-year timeline has been developed, implementing the CT² faculty institute in summer of 2013, and completing our five-year report in 2018.

FAQ: What exactly does SACSCOC require in the QEP? The institution must develop an acceptable Quality Enhancement Plan (QEP) that includes an institutional process for identifying key issues emerging from institutional assessment and focuses on learning outcomes and/or the environment supporting student learning and accomplishing the mission of the institution. The institution must develop a Quality Enhancement Plan that (1) demonstrates institutional capability for the initiation, implementation, and completion of the QEP; (2) includes broad-based involvement of institutional constituencies in the development and proposed implementation of the QEP; and (3) identifies goals and a plan to assess their achievement.

FAQ: How many sections of sophomore seminar will be required? Once the program is fully implemented, we hope to have 200 sections of 19 students each.

FAQ: What do students think about this idea? Undergraduate and graduate student government leaders serve on the QEP Steering Committee and helped us present the preliminary ideas to their groups at the end of the spring semester. Students also participated in the QEP proposal solicitation in fall 2011. Ideas from student proposals are central to the QEP plan we have now. Generally, the students we have spoken with are supportive of the QEP and are encouraging/admonishing/pleading with the committee to be ambitious in making change. Once students return for the fall semester, we are planning a series of student town-hall style meetings and will also collect feedback from student advisory boards for each college.

FAQ: Who will make sure the courses are taught the way they are supposed to be taught? Remember that this is an assessment driven process, so we will have to demonstrate to SACSCOC that we are actually having an impact on student learning. If all we do is approve syllabi and then let faculty and departments do as they wish, there will likely be no impact to report (since we have good evidence we are not teaching critical thinking very well at present). Thus, we will have to exercise more control over these courses than faculty are used to. We will not tell you how to teach, but we will require that your efforts are assessed. Courses and instructors that are not achieving the ends of the program will not be invited to return to the program. The job of reviewing proposals for courses and tracking the results will be given to a committee of faculty. Dr. Leidy Klotz has taken the leadership role in working with faculty champions to develop the first syllabi for approval.

FAQ: Can courses already on the books meet this requirement? Yes and no. You can certainly take a course that your department already offers, redesign as necessary to fit the criteria, and then have it approved for the sophomore seminar. However, the approval is for that particular section (if there are non-seminar sections also offered) and that particular instructor. In other words, you can’t have all sections of PHIL 101, seminar and non-seminar, taught by whomever, approved.

FAQ: Will there be faculty development for teachers? Absolutely! Ultimately, all faculty who teach these courses must go through training, but faculty development needs to be more than this. We understand the importance of providing strong and continuing support for faculty, which could take a number of forms. One result of this program we hope to see is increased discussion on campus about just what critical thinking is and how best to teach it that will help build up a permanent cadre of critical thinking instructors passionate about these courses.
APPENDIX F
Second Year Seminar Course Descriptions

Course Approved:

CU 201 Sustainability Leadership

Course Description: Participants, representing Clemson’s diverse student body, will learn how principles of economic, social, and environmental sustainability apply in contexts ranging from personal lifestyle choices, to the structure of the built environment, to the operation of public and private institutions. Participants will also develop and practice skills to act as agents of change in the University and the broader community.

Course Objectives: Students will work across disciplinary lines to think critically about how they can address great societal challenges related to sustainability. To achieve this course goal, students will:

- define sustainability;
- identify and discuss fundamental issues of sustainability;
- analyze how their values relate to sustainability, and how their actions impact sustainability issues;
- recognize interrelated systems;
- evaluate the role of their major in sustainability issues;
- apply sustainability concepts on local and global scales;
- practice change agent skills for sustainability;
- develop a plan to address sustainability challenges through engagement at Clemson and beyond.

Within the context of the course content, students will also:

- evaluate competing causal explanations;
- evaluate hypotheses for consistency with established facts;
- determine the relevance of information for evaluating an argument or conclusion;
- evaluate the appropriateness of procedures for investigating a question of causation;
- evaluate data for consistency with established facts, hypotheses, or methods; and
- recognize flaws and inconsistencies in an argument.

Courses Submitted:

CT² Seminar—CU 250 Arts and Humanities (Literature)
Catalog Description: Various topics in literature and the humanities. This seminar provides a foundation to help students address chosen challenges and questions through critical thinking and engaged learning. Students will work closely with faculty and fellow students.

CT² Seminar—CU 260 Arts and Humanities (Non-Literature)
Catalog Description: This seminar focuses on debates concerning pressing ethical issues that have a global dimension (e.g., poverty, the environment, women’s rights). The seminar provides a foundation to help students think critically and reflectively regarding these and related issues.

CT² Seminar—CU 240 Cross Cultural Awareness
Catalog Description: This seminar moves beyond superficial comparisons of customs to an understanding of the concept of culture, cultural analysis, and methods for cross-cultural comparison. Through critical thinking, students explore how cultural beliefs and practices give meaning to the experiences of contemporary Global Challenges (e.g., population, resources, technology, information, economic integration, governance).

CT² Seminar—CU 211 Math & Natural Science
Catalog Description: This course will increase students’ critical thinking skills through a detailed analysis of science as a reliable method of acquiring knowledge. Students will learn to distinguish science from non-science, bad science, and pseudoscience by analyzing a variety of claims and case studies in a highly participatory fashion.
CT² Seminar—CU 231 Social Science (General)
Catalog Description: Various topics in social sciences. This seminar provides a foundation to help students address chosen challenges and questions through critical thinking and engaged learning. Students will work closely with faculty and fellow students.

CT² Seminar—CU 230 Social Science (Global Challenges)
Catalog Description: Drawing upon social science methodologies, students in this seminar develop critical thinking skills while exploring contemporary Global Challenges (e.g., population, resources, technology, information, economic integration, security and governance). These, like all global issues, are best understood using a variety of social science methodologies. The class will introduce at least 3 social science approaches to Global Challenges.

CT² Seminar—CU 232 Social Science 2 (Social Science)
Catalog Description: Introduction to the sociological perspective through an examination of how inequality is established, maintained, and reproduced, as well as the consequences of inequality for individuals and society. Specific areas of focus may vary from semester to semester.

CT² Seminar—CU 220 Science, Technology and Society
Catalog Description: This course is an interdisciplinary subject with emphasis on critical thinking and communication to educate and encourage the development of globally competent citizens in the field of S&T in society. Students will learn about global challenges of both today and in the near future in Science and Technologies.
APPENDIX G
Clemson Thinks² Faculty Institute

It is envisioned that the substantive component of Faculty Development Program will be structured as a week long summer institute, providing training for faculty who will be teaching the CT² Seminar and other critical thinking-oriented courses, as well as an ongoing forum for idea sharing and communication among these faculty (the community of CT² Scholars).

The instructional content of the complete four-day Clemson Thinks² Faculty Institute is described below. It will include many participant activities and deliverables, such as a list of student learning outcomes, an outcomes map, critical thinking discussion questions, writing assignments, tests questions, and assessment rubrics. The Institute is designed for the faculty who will be teaching the Clemson Thinks² Seminars focused on critical thinking. The Office of Teaching Effectiveness and Innovation will assist in program development to be held two times (or as needed) during summers, facilitating the involvement of invited experts in critical thinking as well as Clemson faculty.

Faculty, staff, and graduate students will apply to participate in the Clemson Thinks² Faculty Institute. The application will require the participant to indicate what course(s) they intend to teach and how they will adapt this course to fit the CT² Seminar learning outcomes. Once the applicant is accepted to attend the Faculty Institute they will be provided with selected literature on critical thinking and a questionnaire to assess the critical thinking strategies they already use in their course(s).

Outcomes:
The Faculty Institute outcomes for the participants include:

- design and develop a communication-intensive CT² Seminar on the topic or subject the faculty member chooses and that integrates targeted student learning outcomes related to critical thinking;
- redesign and redevelop existing faculty members’ course(s) to integrate the targeted student learning outcomes related to Clemson Thinks²;
- develop and integrate activities and assignments into faculty members’ courses that will develop the targeted CT² skills in their students and enhance academic and engagement experiences;
- develop strategies for engaging students and ensuring they comprehend assignments and are achieving CT² learning outcomes;
- identify alternatives for assessing student CT² skills;
- monitor and assess students’ competency in CT² skills using multiple assessment instruments.
INSTITUTE SCHEDULE:

Day 1: Introduction to Critical Thinking and Clemson Thinks²

What is the QEP (Clemson Thinks²)? What is Critical Thinking? – Faculty Institute Leadership/Keynote Speaker
- What is the QEP justification for critical thinking focus?
- How can this be applied? (Introduction of Louisville QEP)
- Define and understand critical thinking by reviewing related literature
- Discussion of what fosters critical thinking in current courses

Explanation of targeted student learning outcomes for Clemson Thinks² and other CT² courses, according to 1) the ETS Profile and 2) California Critical Thinking Skills Test
- Participants will take the online CCTST and the Critical Thinking Assessment Test (CAT).
- Participants will discuss the experience.

Day 2: Interactive Faculty Development

Explanation of the assessment tools that will be used for the second year seminar: The two instruments are Critical Thinking Assessment Test (CAT) originally developed at Tennessee Tech and the California Critical Thinking Skills Test (CCTST, P. Facione)
- When to administer the test to students
- Who will see the scores
- How data will and will not be used

CAT as a development tool, participants will:
- Experience CAT scoring
- Assess CT skills with objective questions and preparing students to take multiple choice assessment instruments
- Gain practice in interpreting results of both the CAT and the California assessment instruments

Day 3: Critical Thinking Strategies for the Classroom/Course Development

Faculty Panel: sharing teaching experiences using faculty from different colleges to discuss success stories and strategies in critical thinking
- What do we think works in CT² instruction?
- How do we engage students with CT² instruction, and how do we integrate and encourage engagement activities into the CT² Seminar?

Strategies for Critical Thinking in the classroom: Engaging students in CT², teaching CT² skills (mentoring and teaching tools)
- Stages to guide students through (three models)
- Self-regulated learning activities, including reflective writing to articulate beliefs
- Logical fallacies
- CT² questions and tasks for learning activities (discussion, exercises, lab) and assessment
- Mapping arguments
- Socratic method
- CT² in engineering disciplines
- Integrating engagement activities into the CT² Seminar

Designing and developing a course with a CT² focus:
- Formulating good student learning outcomes
- Dealing with students’ faulty mental models/misconceptions about subject matter and CT²
- Ordering/sequencing CT² outcomes and integrating them with content-oriented outcomes
Day 4: Engagement/Assessment/Courses/Conclusions

Engagement Panel Discussion: Ways to integrate Engagement Activities into your CT² course (see Engagement discussion below)

- What constitutes engagement?
- How does CT² fit in engagement?
- How to use engagement in CT² courses?
- How has engagement been used in the past, how to incorporate it now?
- What safe guards need to be used in the engagement experiences (especially if travelling outside the University)
  - Safety precautions
  - IRB and studies using IRBs
  - How to protect students
  - Risk Management issues

Engaging students in meaningful discussions

- CT² questioning techniques
- Social side of discussion management: eliciting broad, active, civil participation

Monitoring and assessing students’ CT² progress

- General assessment guidelines
- Main types of assessment instruments and what cognitive operations they can assess:
  1. Objective test items
  2. Student-constructed work (e.g., writing assignments, oral presentations, projects)
- Assessing CT² skills with student-constructed work (focus on writing assignments)
  - Formulating good CT² writing assignments and essay questions; examples from our faculty
  - Evaluating writing and CT², includes developing good rubrics and providing useful feedback; examination of model rubrics

Critical Thinking and Scholarship:

- Ways to incorporate teaching CT² into grant proposals
- Publishing on teaching pedagogy

Discussion of course development, strategies to be used in Clemson Thinks2 Seminar courses, and assessments to be used in courses

Faculty Institute evaluation
APPENDIX H
FOUNDING DIRECTOR
CLEMSON THINKS²

Clemson University seeks to identify a Founding Director for a new Clemson Thinks². Clemson Thinks² is a quality improvement initiative designed to dramatically enhance Clemson student learning in the area of critical thinking. By offering stimulating second-year critical thinking seminars taught by a faculty of expert CT² Scholars, Clemson Thinks² has as its goal to transform the undergraduate learning experience at Clemson University. Clemson Thinks² is the university’s QEP (Quality Enhancement Plan) under the SACSCOC reaffirmation requirements.

The Founding Director will provide leadership to this initiative beginning with the later phases of program development through early implementation, after which time a search for a permanent director will be conducted.

Clemson Thinks² is a part of Clemson’s Division of Academic Affairs. The Founding Director will report to the Vice Provost for Academic Affairs and Dean of Undergraduate Studies.

Primary Responsibilities
1. Program development & administration
   a. Overall responsibility for managing all aspects of the CT² program.
   b. Work with Office of Institutional Effectiveness and QEP Advisory Committee to ensure that the program is effective
   c. Budget oversight
   d. Program promotion – lead spokesperson; communications; fund-raising
2. Staffing
   a. Develop position descriptions
   b. Recruit and hire; Supervise and develop
3. CT² Faculty & Graduate Students
   a. Recruit CT² faculty
   b. Design and implement faculty development program
   c. Manage faculty incentives
   d. Oversee CT² Scholar evaluation process
   e. Oversee design and implementation of graduate student CT² participation
4. CT² Course Offerings
   a. Evaluate course offering
   b. Shepherd courses through curriculum approvals
5. Assessment – Work with Office of Assessment to
   a. Coordinate scoring of CT² learning assessments by course and ETS Proficiency results
   b. Review and follow-up on individual course assessment(s)
   c. Analyze totality of CT² assessment data and take action as needed
6. Teach at least one CT² seminar per year
7. Research
   a. Oversee CT² research activities of research coordinators
   b. Facilitate interactions between research coordinators and CT² scholars

Qualifications
- Ph.D. degree and academic credentials sufficient to secure tenure in a Clemson department
- Record of commitment to undergraduate teaching and learning
- Knowledgeable about critical thinking – what it is, how to teach students to do it, how to assess it
- Familiarity with SACSCOC Quality Enhancement Plan requirements
- Administrative experience (program development, budget, supervision)
- Demonstrated commitment to assessment and “closing the loop”
APPENDIX I
Strategic Hire Pre-Proposal:
A Research Team for *Clemson Thinks*²

Abstract

A core requirement for SACSCOC reaffirmation is providing a university-wide quality enhancement plan (QEP), which makes it vital that our QEP is successful. Clemson, along with sixteen other universities nationwide, has identified critical thinking as an important student learning outcome in need of improvement. The basic plan of the *Clemson Thinks*² initiative is to develop a cadre of Critical Thinking Scholars across campus who will teach a variety of sophomore level critical thinking seminars as well as undertake other activities to help build a vibrant campus culture around critical thinking. The design is unique in that it emphasizes a systematic approach to assessing what actually works in the classroom that will result in a dataset on teaching critical thinking of unprecedented size and quality. This proposal seeks to leverage that design in a way which will enhance the goals of the QEP, put Clemson at the very forefront of research on an important national educational issue, and help attract significant external support.

We are thus requesting two faculty members whose job it will be to capitalize on the data we will be generating and use it to develop a major research initiative. They will ensure that *Clemson Thinks*² 1) becomes the leading model of metacognitive assessment and critical thinking pedagogy, 2) is integrated into the research of others interested in critical thinking, and 3) attracts significant external funding. In addition, we envision that the research team can assist in examining critical thinking and its link to engagement. Engagement is an important component of the 2020 Road Map, and research into the effectiveness of engagement as part of an academic core is important.

President Jim Barker has said that what happens in the classroom at Clemson is the “core of the core”. It is in that spirit that we proposed *Clemson Thinks*², since it has the potential to transform the way we educate our students. The basic idea is to create a community of critical thinking scholars with the support they need to focus their energy on innovative teaching of critical thinking in a series of small seminars across the entire campus. These seminars will quickly grow into a set of hundreds of experiments, with data from pre and post testing of thousands of students, which would be manna from heaven to a field sorely pressed for high quality data. And the fact that no less than 17 schools have identified critical thinking as the focus for their own quality enhancement plans shows that this is a widespread problem facing universities in general and thus a major national educational issue.

There is clear consensus among academics that critical thinking is one of the most important skills students should learn in a university environment. The data is also quite compelling that universities do not currently do a very good job giving their students what they need in this respect. On the other hand, there is very little consensus as to how best to go about addressing this problem because the available data is so poor. The problem is that the literature on critical thinking is very diverse – what counts as critical thinking varies from study to study, as do the assessment tools, sample sizes, etc. It is extremely costly and difficult to conduct large scale experiments and thus it is very difficult to draw clear conclusions without the use of meta-studies, in which case the resolution afforded is very limited.
## Appendix J: Timeline and Changes Made During the Process of Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Year 01</th>
<th>Year 02</th>
<th>Year 03</th>
<th>Year 04</th>
<th>Year 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop the QEP-Draft released April 23, 2012 ✔️</td>
<td>Meet with Consultants: Barry Goldstein, June 12, 2012 ✔️</td>
<td>Complete the formal report for SACSOC submission ✔️</td>
<td>Approval of QEP by Site Visit Team-April 2013</td>
<td>Begin QEP implementation—Seminars initiated—10 to 40</td>
<td>Increase to 80 to 100 sections</td>
</tr>
<tr>
<td>Identify barriers and solutions Meet with UUC 5/6/12 regarding core curriculum ✔️</td>
<td>Consultant re: Incentives for Changing General Education (UNC-CH recommended)</td>
<td>Recommend Formal Organizational Structure for implementation of CT ✔️</td>
<td>Recommend initial director for implementation to President and Provost Job Position submitted for posting ✔️</td>
<td>Full Time Director, supported by Undergraduate Studies; Hire Research Faculty member and Research Coordinator</td>
<td>Add Assistant Director; 2nd Administrative Assistant</td>
</tr>
<tr>
<td>Communicate the plan to the campus-Town Hall meetings scheduled—start 5/6/12 Blog—started 3/7/12 ✔️</td>
<td>Work with Neil Cameron and Marketing ✔️</td>
<td>Clemson Thinks—need logo Draft provided, need details and spokesperson ✔️</td>
<td>Highlight SACSOC Visit and QEP activities prior to April onsite visit</td>
<td>Initiate student tracking system, intensive data collection, course evaluation systems (communication intensive, assessment, pre/post testing, ETS)</td>
<td>First Sophomores to enroll in CT Seminars Seminar requirement</td>
</tr>
<tr>
<td>Propose structure for the CT course to allow wide spread participation Subcommittees assigned for seminar and academic engagement—3/7/12 ✔️</td>
<td>Consultant—expert on teaching critical thinking; Sent faculty to programs rather than bringing consultants to campus</td>
<td>Seek approval of CT Seminar and develop courses to meet General Education Requirements</td>
<td>General Education/CT2 courses to be submitted in January 2013 ✔️</td>
<td>Implement CT2 Scholars Programs</td>
<td>Expand to include Annual Programs for CT Scholars, development and travel</td>
</tr>
<tr>
<td>Faculty and Graduate Student Workshops Established Subcommittee 5/3/12 ✔️</td>
<td>Subcommittee established; involve OTEI ✔️</td>
<td>Develop Faculty and Graduate Student Workshops on Teaching Critical Thinking-Limited Pilot ✔️</td>
<td>Prepare for first Faculty Institute. Invite participation—letters to all faculty</td>
<td>Recruit, implement and assessment of Faculty Institutes</td>
<td>Continuation of the Community of Scholars in CT</td>
</tr>
<tr>
<td>Identify Components of Professional Development Certificate for Graduate Students Established Subcommittee 5/3/12 ✔️</td>
<td>Subcommittee to be established with Grad Dean and Grad Student Government</td>
<td>Pilot tested several assessment instruments ✔️</td>
<td>Continue pilot of CT2 courses and assessment strategies; use QEP Steering Committee as “test” subjects</td>
<td>Appoint an Advisory Committee for CT2</td>
<td>Advisory Committee identifies actions needed</td>
</tr>
</tbody>
</table>

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Appendix J: Timeline and Changes Made During the Process of Development