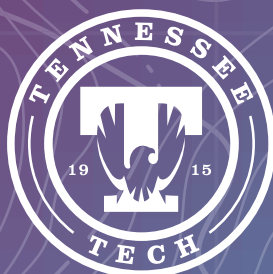# EDGE

ENHANCED DISCOVERY — THROUGH — GUIDED EXPLORATION

2016-2021
QUALITY ENHANCEMENT PLAN
TENNESSEE TECH UNIVERSITY

Submitted to
Southern Association of Colleges and Schools
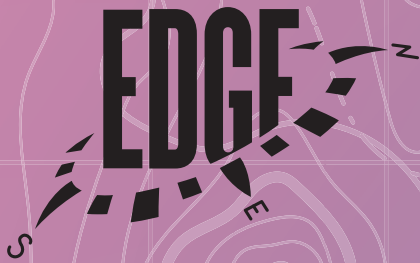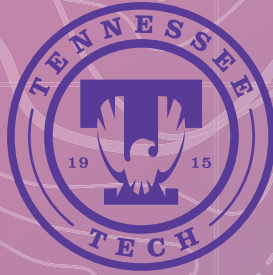**Commission on Colleges (SACSCOC)**

EDGE

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On-Site Visit
March 29 – 31, 2016

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I. EXECUTIVE SUMMARY

Tennessee Tech University has developed EDGE: Enhanced Discovery through Guided Exploration as its five-year Quality Enhancement Plan (QEP). The overarching goal of EDGE is to enhance student learning by infusing creative inquiry throughout the undergraduate experience. We propose an integrated curricular and co-curricular plan whereby our students will develop the skills to formulate creative inquiry questions or problems, decide on proper approaches to address them, explore relevant evidence, and produce and present their findings or creations. We anticipate that active engagement in creative inquiry will improve our students' creative and critical-thinking skills, problem-solving skills, and communication skills.

The four goals of the plan are to (1) establish an undergraduate curriculum that encourages student success in creative inquiry, (2) expand student co-curricular opportunities for undergraduate creative inquiry, (3) support and acknowledge faculty and students who engage in creative inquiry, and (4) develop the infrastructure to support undergraduate creative inquiry.

In the process of selecting the topic and developing EDGE, the QEP Committee was motivated to (1) craft a representative process that valued input from a wide range of constituents, including faculty, students, staff, employers, and alumni; (2) promote the University's mission and institutional priorities; (3) identify opportunities for improved student learning via a thorough review of institutional needs; (4) complement or strengthen existing programs at Tennessee Tech; (5) consider best practices at other institutions; and (6) provide our graduates with the skills that employers and society value. EDGE embodies these objectives. Broad campus support for the plan is evident, as demonstrated by the participation of 21 academic departments from six schools or colleges in our pilot year.

Detailed student learning outcomes (SLOs) that are tied directly to institutional needs have been crafted to directly address the principal elements of creative inquiry while simultaneously including all disciplines. Tennessee Tech also anticipates improvement in program outcomes, including increasing curricular and co-curricular opportunities for students to engage in creative inquiry, and increasing faculty support of these activities. SLOs and program outcomes will be assessed with a mix of direct and indirect assessments. Direct measures include the Information Literacy Test (ILT), the Critical thinking Assessment Test (CAT), the California Critical Thinking Skills Test (CCTST), and the EDGE Rubric, which will be used by faculty for assessing student artifacts. A collection of surveys will be used as indirect measures.

Tennessee Tech will provide the financial, physical, and human resources to initiate, implement, sustain, and complete EDGE. The University is committing approximately $4.1 million in total resources, including pilot-year investments, over the six-year implementation of the QEP. The organizational structure of EDGE has been created in order to make reporting responsibilities and oversight clear. Additionally, key EDGE personnel are in place.

As the project progresses, Tennessee Tech's new Office of Creative Inquiry will administer and carefully analyze all budget-related expenses. The project will proceed in accordance with a detailed timetable that establishes the implementation of various program elements, budgetary expenditures, and assessment plans over the course of a multi-year time frame.
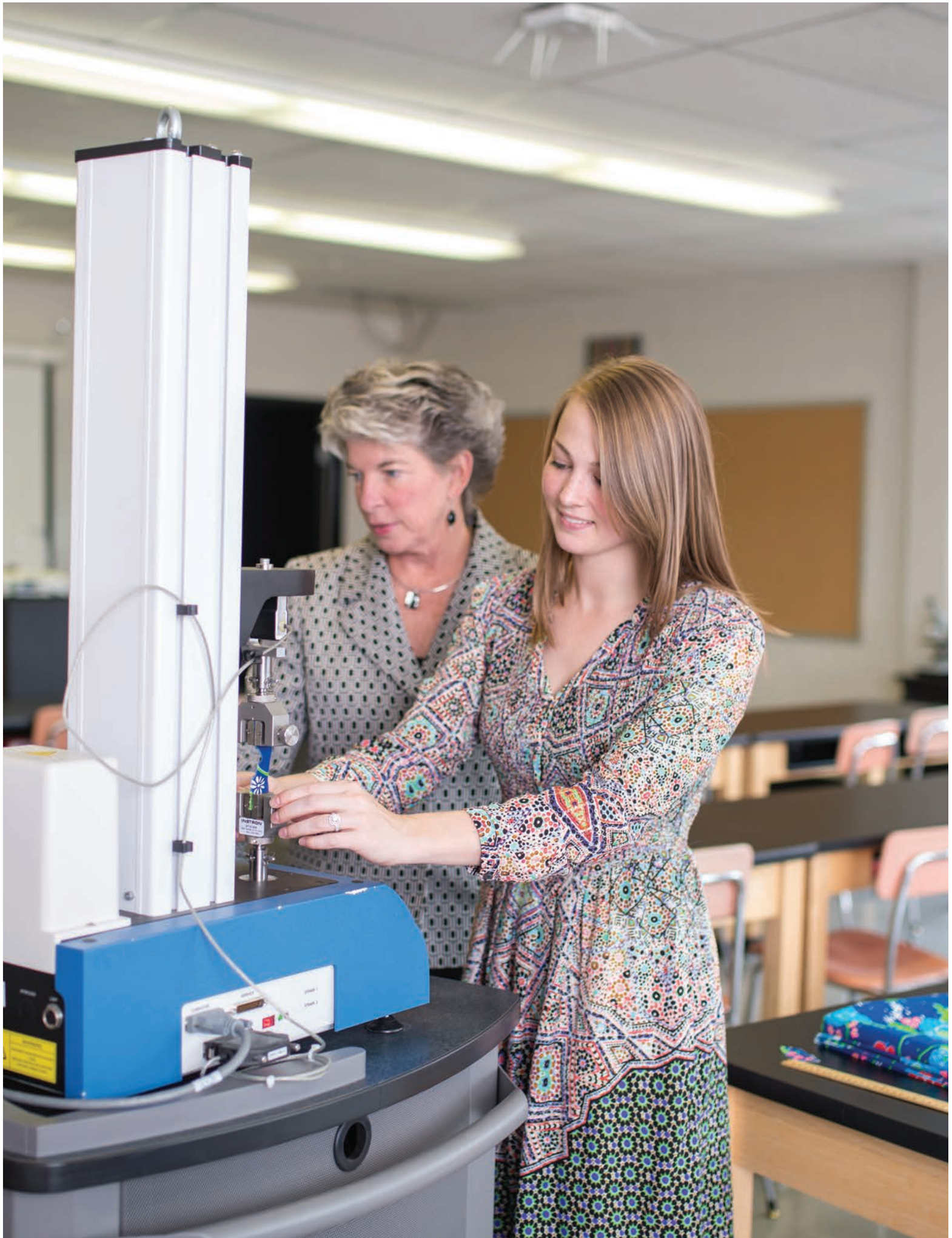
II. PROCESS USED TO DEVELOP THE QEP

2.1 QEP TOPIC SELECTION PROCESS

Our proposed QEP is the product of 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." This chapter describes the process that was used to develop the QEP. Chapter III explains why "creative inquiry" is the right fit for Tennessee Tech, based on institutional data and priorities.

An initial review of institutional data was conducted by Tennessee Tech's QEP Committee from November 26, 2013, to March 18, 2014. The QEP Committee consisted of faculty from every college, staff, administration, and students. Appendix 1 lists committee members and their campus affiliation. At the committee meeting held Nov. 26, 2013, results from the most recent National Survey of Student Engagement (NSSE) (2011) were distributed to the committee and discussed. The data for each section of the NSSE (for example, Section 1, Academic and Intellectual Experiences) were presented in a sorted format, according to the magnitude of the difference for each question between the mean response of Tennessee Tech students and the mean response of students at our Carnegie Class peer institutions. The 2011 NSSE survey results were also distributed electronically to the committee as an Excel file, with each worksheet corresponding to a different section of the survey, and as sorted PDF files with the data sorted in two ways: (1) as mentioned above and (2) within each section, sorted according to the magnitude of the mean values of Tennessee Tech students' responses for each question (available upon request). Seeing the NSSE data in both formats, i.e., as both absolute and relative measures, allowed committee members to more readily identify key issues for improved student learning, a key

component of SACSCOC Core Requirement 2.12. By analyzing the data sorted in absolute terms, faculty could directly grasp the strengths and weaknesses that our students perceive in their experience. Alternatively, by analyzing the data relative to our Carnegie Class peers, faculty could easily see how the experience of our students compared with the experience of their peers at other institutions.

Other data that were distributed and discussed during this time period included the results from Tennessee Tech's 2012-2013 Alumni Survey, 2012-2013 Employer Survey, and 2011-2013 CCTST. Data from the 2011-2013 Individual Development and Educational Assessment (IDEA) of teaching and learning were also distributed and reviewed. All of these data were also available on the website of Tennessee Tech's Office of Institutional Research (Tennessee Tech University, 2015a). Tennessee Tech's Vision Statement, Flight Plan: Focused for the Future (Tennessee Tech University, 2015b), was also reviewed. In addition, a chart of the 10 American Association of College and Universities (AAC&U) High Impact Educational Practices (AAC&U, 2013) was distributed, and these practices were discussed.

With the assessment of the above-described data underway, the next step in the process to develop our QEP was to narrow the number of possible topics for further consideration. The QEP Committee first reviewed topics of QEPs at other institutions and then generated a list of 24 possible topics for consideration (Appendix 2). An electronic Survey Monkey® poll was administered from March 19 to March 24, 2014, using partial block voting whereby each committee member could select up to eight topics. The results of the survey are shown in Table 2.1 with the topics listed in rank order by preference.

2.1 Results of QEP Committee Initial Topic Survey.

Rank	Topic
01	**Creative thinking**
02	**Engaged learning/high impact practices** (undergraduate research, service-learning, study abroad, internships, volunteering, etc.)
03	**Critical thinking**
04	**Diversity/intercultural knowledge and competence**
05	**Integrated and applied learning** (integrating formal instruction and co-curricular activities)
06	**Lifelong learning foundations and skills**
07 (tie)	**Teamwork**
07 (tie)	**Problem solving**
09 (tie)	**Information literacy**
09 (tie)	**Inquiry and analysis**
11 (tie)	**Written communication**
11 (tie)	**Civic engagement**

The results of this survey, as well as the overall plan to craft our QEP, were shared with various campus constituencies including our senior administration, Student Government Association, Faculty Senate, and Dean's Council throughout the month of April 2014. Appendix 3 shows a timeline of various interactions with the Tennessee Tech community. Developing the proposed plan would involve

1. using an online survey of the greater campus community to determine possible topic elements
2. announcing the survey results
3. soliciting proposals or white papers that would ask authors to offer general concepts of plans, with stipends to be paid to the highest rated proposals, and with the inclusion of a rubric that would detail how the proposals would be assessed
4. independent analyses by QEP Committee members of the proposals using the rubric published with the solicitation
5. aggregating the independent analyses and ranking the proposals
6. examining the highest ranking proposals for common themes
7. selecting a single cohesive topic, as described below

Shortly after the commencement of the new academic year in August 2014, the QEP Director and QEP Committee members met with various campus constituencies to update them on the QEP topic selection process and solicit their feedback (Appendix 3). As a result of these consultations, the survey topics were slightly changed, primarily

by merging related topics. For example, "Engaged learning/high impact practices" and "Integrated and applied learning" were combined to produce "Engaged/experiential learning: integrating formal instruction and co-curricular activities such as undergraduate research, service learning, study abroad, and internships; as well as one-time on-campus or off-campus events." In addition, "Critical thinking" and "Information literacy" were combined by defining "Critical thinking" as "fostering student ability to assess claims, theories, or hypotheses by accessing and evaluating relevant evidence, identifying biases and assumptions, and considering multiple perspectives." An electronic survey using a Likert-scale format was conducted from Aug. 30, 2014, to Sept. 19, 2014. Separate surveys were administered to faculty, staff, students, alumni, and employers. Appendix 4 presents the faculty survey as an example. Copies of the other surveys are available upon request. Participation in the survey was broad and included 170 faculty, 126 staff, 391 students, 180 alumni, and 62 employers. The Likert-scale responses from each group were ranked according to the relative support for each topic from 1 to 10, with 1 corresponding to the topic that had the greatest support to 10 corresponding to the topic that had the least support. The rankings by each of the five groups for each of the 10 topics were then averaged to determine the overall support by the greater campus community for each topic. As shown in Table 2.2, the greater campus community indicated a desire to enhance learning in these areas in particular: problem solving, critical thinking, communication skills, creative thinking, and engaged/experiential learning.

TABLE
2.2
Results of Faculty, Staff, Student, Alumni, and Employers QEP Topic Survey.

Rank	Topic
01	**Problem solving:** foster student ability to design, evaluate and implement a strategy to answer an open-ended question or achieve a desired goal
02	**Critical thinking:** foster student ability to assess claims, theories or hypotheses by accessing and evaluating relevant evidence, identifying biases and assumptions, and considering multiple perspectives
03	**Communication skills:** improve student written and oral communication skills
04	**Creative thinking:** foster student ability to bring together existing ideas into new configurations, develop new possibilities for something that already exists, or discover or imagine something new
05	**Engaged/experiential learning:** integrating formal instruction and co-curricular activities such as undergraduate research, service-learning, study abroad, and internships; as well as one-time on-campus or off-campus events
06	**Lifelong learning skills:** prepare students for lifelong learning following graduation
07	**Teamwork skills:** foster the ability of students to collaborate effectively with others
08	**Global awareness:** enhance student knowledge of world events
09	**Civic awareness:** enhance student knowledge of national/local events
10	**Intercultural competence:** promote student appreciation for diversity

Results of the survey were announced via Tech Times, our internal e-newsletter for faculty, staff and students, on Sept. 24, 2014, and posted to our QEP website (Tennessee Tech University, 2015c). QEP topic proposals were also solicited via Tech Times at this time, with a deadline date for proposals of Nov. 7, 2014 (Tennessee Tech University, 2015d). The solicitation for proposals was posted regularly on Tech Times until the due date. The solicitation also noted that it was expected that all submittals would

- respond to the University's vision, mission, and current strategic plan, Flight Plan: Focused for the Future (Tennessee Tech University, 2015b)
- respond to current Tennessee Tech assessment results as presented on the University website (Tennessee Tech University, 2015a)
- respond to the results of the QEP topic survey (Tennessee Tech University, 2015c)
- include a total budget with an average yearly budget ranging from $200,000 to $500,000

To encourage participation, honoraria up to $1,500 per team or $500 per team member were offered for the three top-ranking submittals, as judged by the QEP Committee using the rubric included in the solicitation. While QEP Committee members were permitted to submit proposals, it was stated in the solicitation that they were not eligible to receive honoraria, nor could they review their own proposals. A town hall-style luncheon was held on Oct. 9 in the Roaden University Center to answer any questions with respect to the submittal process. Items that were to be judged with the rubric were based on the SACSCOC QEP Guidelines, and items included

1. the major elements in the current student learning environment that the QEP topic would address
2. the Focus Statement of the proposed QEP

3. the strategies and activities of the proposed QEP
4. the tangible results that could be expected with the proposed topic
5. the impact on student learning, measured by direct and indirect measures
6. the relationship to Tennessee Tech's Strategic Plan and Mission
7. the potential for broad-based impact
8. the potential for assessment of impact on student learning
9. the potential for gaining widespread support at Tennessee Tech
10. the potential for rapid implementation of the plan
11. the potential to adjust the plan based on assessment
12. the resources needed to implement the plan

Seven proposals were submitted for consideration (Table 2.3) (proposals available upon request). The QEP Committee members scored the proposals independently using the rubric included in the solicitation. Based on the aggregated results of these independent evaluations, the proposals were ranked overall as shown in the table.

To produce a single cohesive plan from those with the highest assessments, the QEP Committee formed a smaller Topic Recommendation Subcommittee at the Nov. 18, 2014, QEP Committee meeting. The subcommittee was chaired by Dr. Lenly Weathers, QEP Director, and included Dr. Rita Barnes, Director of the Honors Program; Ms. Shelley Brown, Sociology and Political Science; Dr. Kevin Harris, Center for Assessment and Improvement of Learning; Dr. Ed Lisic, Undergraduate Research and Creative Activity (URECA!) Director; Dr. Claire Stinson, Vice President for Planning and Finance; Dr. Thomas Timmerman, Business Management; and Ms. Kimberly Winkle, Art. This subcommittee met regularly throughout the next two months to discuss the similarities and unique attributes of the top proposals. An

TABLE

2.3 **Proposals Submitted for Consideration as 2016-2021 QEP Topic.**

Proposal Title	Author(s)	Rank
First Flight: Highlighting Research Inquiry And Creative Expression In The First Year Experience	Dr. Lenly J. Weathers	*1*
The SURE Initiative: Service Learning, Undergraduate Research, And Entrepreneurship	Dr. Edward Lisic, Dr. Melissa Irvin, Mr. Michael Aikens, Ms. Michelle Huddleston, and Ms. Elizabeth Lisic	*2*
TTU THINKS: Engage, Collaborate And Soar!	Ms. Shelley Brown, Mr. Kevin Harris, and Dr. Jennifer Pascal	*3*
High Impact: Engaged Learning In The First Year Experience	Dr. Lenly J. Weathers	*4*
Renaissance Foundry	Dr. Pedro Arce, Ms. Andrea Arce-Trigatti, Dr. Laura Arias Chavez, Dr. Melissa Geist, Ms. Lacy Loggins, Dr. Jennifer Pascal, Mr. Marbin Pazos-Revilla, Dr. Jeffrey Rice, Dr. Robby Sanders and Dr. Ken Wiant	*5*
Enhanced Student Feedback	Dr. Jeffrey Rice	*6*
Communication Across Cultures	Ms. Jenny L. House Maffet and Ms. Tammy W. Howard	*7*

analysis of the top four proposals showed that they had much in common, with each focusing on inquiry: First Flight and High Impact, for example, focused on improving inquiry skills of first-year students, while The SURE Initiative and TTU Thinks had a similar aim, but included all undergraduates. TTU Thinks and The SURE Initiative also proposed a three-tiered, "scaffolded" pedagogy for our students to grow their inquiry-related skills as they progressed through their curricula. Each of these plans also proposed a course development grant program. TTU Thinks also highlighted undergraduate student scholarship as an experiential learning activity. The SURE Initiative likewise included undergraduate research as an experiential learning opportunity and also proposed service learning and entrepreneurship as two other experiential learning foci. The student learning outcomes in each proposal were also very similar, each seeking to improve student learning in

the top-ranked topical areas from the campus-wide survey: problem solving, critical thinking, communication skills, creative thinking, and engaged/experiential learning.

Parallel with this discussion, the subcommittee researched QEPs of other universities with similar student learning outcomes with an emphasis on inquiry, problem solving, critical thinking, scholarship or research. With this background in mind, and after holistically considering

1. the common theme of "inquiry" in the various proposals
2. the survey of students, faculty, staff, alumni, and employers that showed broad support for a topic that included improving problem-solving skills, critical-thinking skills, communication skills, and creative-thinking skills
3. the importance that employers placed on problem-solving skills, critical-thinking skills, and communication skills (as described in Chapter III, Topic Selection)
4. the requirement that our theme should have broad appeal across campus
5. the opportunities for improved student learning based on 2014 NSSE data, which had recently become available (as described in Chapter III, Topic Selection)
6. the direction of Tennessee Tech through its mission and vision statements

the Topic Recommendation Subcommittee chose "undergraduate creative inquiry" as our proposed QEP topic on Jan. 20, 2015. Buck et al. (2008) note that diverse types of inquiry—including traditional inquiry, guided inquiry, structured inquiry, open inquiry, directed inquiry, authentic inquiry, partial inquiry, and full inquiry— abound in educational practice and that the meanings of these terms vary by instructor. We have chosen the modifier "creative" in order to emphasize what Einstein (1954) termed "combinatory play," i.e., the ability to connect previously unconnected concepts, as an essential feature of inquiry and problem solving. Our unique definition of "creative inquiry" is derived from the AAC&U VALUE rubrics as

The process of exploring issues, objects or works through the collection and analysis of evidence including combining or synthesizing existing ideas, products, or expertise in original ways to answer an open-ended question or achieve a desired goal.

The Topic Recommendation Subcommittee met with various campus constituencies in January and February 2015 to discuss the recommendation of "Undergraduate Creative Inquiry" as our new QEP topic and to solicit feedback (Appendix 3). The Topic Recommendation Subcommittee also recommended that our QEP include a curriculum grant program, similar to the QEP course grant program that we have administered since 2006, as well as a co-curricular individualized research program similar to our URECA! grant program that we started in 2010. These existing programs are described in Chapter III. It was also recommended that we adopt a three-tiered, "scaffolded" pedagogy for our students to grow their creative inquiry skills as they progressed through their curricula. Tier 1 would introduce the foundational skills of creative inquiry upon which students would build in the higher tiers. Tier 2 would develop core skills of creative inquiry, and Tier 3 was envisioned as full immersion in a creative inquiry experience. This three-tiered system, along with our complete plan, is described in Chapter VI. On March 4, 2015, the QEP Committee—composed of faculty from every College, the SGA President and Vice President, staff, and administrators—unanimously approved "Undergraduate Creative Inquiry" as our QEP topic.

2.2 QEP PLANNING PROCESS

As mentioned above, during the meetings held to identify our topic in late 2014 and early 2015, the Topic Recommendation Subcommittee had reviewed best practices of QEPs from other universities and discussed how specific elements from them might be tailored to our institutional context, in addition to discussing unique elements that might be included in our QEP. Proposed elements, including student learning outcomes, assessment measures, and the structure of our curriculum grant program, were shared at the meetings held with the various campus constituencies during the January and February 2015 meetings.

Concurrently, in April 2015, Provost Bahman Ghorashi charged the Director of Tennessee Tech's First Year Experience (FYE) Program, Dr. Linda Null, with forming an FYE Revitalization Committee, with the goal of improving the effectiveness of our FYE Program. First-year seminars and experiences are one of the AAC&U's acknowledged "High-Impact Educational Practices." As stated by AAC&U: "The highest-quality first-year experiences place a strong emphasis on critical inquiry, frequent writing, information literacy, collaborative learning, and other skills that develop students' intellectual and practical competencies." Central to Tennessee Tech's FYE program is UNIV 1020, University Connections, a 1-credit hour course designed to help new students build the academic, social, and professional connections needed for a successful college career. This course, or an equivalent, is required of all first-year students in their first fall semester. In Fall 2015, there were approximately 110 sections of UNIV 1020, or equivalent, courses offered on campus. The FYE Revitalization Committee was composed of several members of the QEP Committee, including Dr. Lenly Weathers, Dr. Ed Lisic, and Dr. Melissa Irvin. One of the proposed learning outcomes that the FYE Revitalization Committee supported for our redesigned FYE course was that "students will demonstrate how to effectively evaluate information sources and utilize University libraries and information systems for academic inquiry." At the April 20,

2015, FYE Revitalization Committee meeting, Dr. Null requested that committee members review FYE best practices of other universities. A subsequent analysis by Dr. Weathers, shared with the FYE Revitalization Committee on June 10, 2015, showed that many schools utilize online, interactive modules to bolster their students' information literacy skills.

The QEP Committee met throughout the summer of 2015 to develop our plan, continuing to build on the work done by the Topic Recommendation Subcommittee. The development of our plan was also aided by meetings with our external consultant on April 3, 2015, and June 22, 2015. Our plan is presented in subsequent chapters.

III. IDENTIFICATION OF THE TOPIC

In the process of identifying the QEP topic, we were motivated to (1) promote the University's mission and institutional needs, (2) complement or strengthen existing programs at Tennessee Tech, (3) identify areas of strength and opportunities for improved student learning based upon a review of institutional data, and (4) provide our graduates with the skills that employers and society value. This section provides support of the selection of our topic with respect to these issues.

3.1 TENNESSEE TECH UNIVERSITY

3.1.1 Background

Tennessee Tech began in 1909 as a state-approved, church-supported school, popularly known as Dixie College. With an act of the General Assembly in 1915, Dixie College became Tennessee Polytechnic Institute (TPI). The five schools that comprised TPI were reorganized into colleges in 1965, and it was at this point TPI was established as Tennessee Technological University. Tennessee Tech currently offers more than 40 bachelor's degree programs and 20 graduate degree programs across eight academic areas: College of Agriculture & Human Ecology, College of Arts & Sciences, College of Business, College of Education, College of Engineering, College of Graduate Studies, College of Interdisciplinary Studies, and Whitson-Hester School of Nursing.

The campus is located in Cookeville, a town of about 25,000 residents. Cookeville is located approximately 85 miles east of Nashville and approximately 100 miles west of Knoxville and north of Chattanooga. Cookeville is the largest and most centrally located city in Putnam County and the Upper Cumberland region. In Fall 2014,

Tennessee Tech's headcount enrollment totaled 11,339, with approximately 86 percent of students hailing from Tennessee and a total of 33 states being represented. Undergraduates numbered 10,314, while graduate students totaled 1,025. Approximately 12 percent of the student body represents minority groups. About 43 percent of the undergraduate students and 57 percent of the graduate students are women. Non-U.S. citizen students (international students) represent close to 12 percent of the total student population.

3.1.2 Mission, Vision, and Strategic Plan

The mission of Tennessee Tech (Tennessee Tech University, 2015a) is centered on the fact it is the state's only technological university and seeks to provide leadership and outstanding programs in engineering, the sciences, and related areas. To serve students throughout the state, nation, and other countries, Tennessee Tech also boasts strong programs in arts and sciences, business, education, agriculture and human ecology, nursing, music, art, and interdisciplinary studies. EDGE is well-aligned with the University's mission, which states, in part, that "the University is committed to the life-long success of students in its undergraduate, master's, specialist, and doctoral degree granting programs through high-quality instruction and learning experiences. The University is engaged in scholarly activity, especially basic and applied research, creative endeavors, and public service, with special emphasis on community and economic development." EDGE, which includes the goal of establishing an undergraduate curriculum that provides students the intellectual skills necessary to successfully engage in undergraduate creative inquiry, is thoroughly aligned with our mission.

Flight Plan: Focused for the Future (Tennessee Tech University, 2015b) is the University's strategic plan and evolved, in part, from a gap

analysis completed in 2013. The gap analysis identified peer institutions to assess comparative performance metrics on different levels. Three groups were identified as either aspirational peers, national peers, or Tennessee peers. Aspirational peers include Clemson University, Miami University (Ohio), James Madison University, SUNY-Binghamton, and the University of New Hampshire. National peers include Louisiana Tech, South Dakota State, Murray State, New Mexico State, University of Alabama at Huntsville, University of Idaho, University of Maine, and Appalachian State. Tennessee peers include the University of Memphis, East Tennessee State, Middle Tennessee State, and University of Tennessee at Chattanooga. EDGE directly connects with the following aspects of the Flight Plan:

1. Improve Undergraduate Student Experience
    a) Enhance quality of undergraduate student experience
3. Create Distinctive Programs and Invigorate Faculty
    a) Expand research and faculty scholarly activity
    f) Provide undergraduate research opportunities

3.1.3 Existing Strengths in Creative Inquiry

2006-2015 QEP: Improving Critical Thinking and Real World Problem Solving

From 2006 until 2011, Tennessee Tech's QEP was "Improving Critical Thinking and Real World Problem Solving Skills," with the primary goal of improving students' skills in these areas through the use of innovative active learning strategies. This program was continued until May 2015, as part of a state performance funding plan. To help achieve success and to encourage the broadest possible campus participation, three foci were identified for emphasis: communication skills, teamwork skills, and creative-thinking skills. The principal component of this plan was a grant program to fund innovative projects. Typically, these projects were conducted by faculty in

their academic courses. The impact of each project was assessed directly and/or indirectly at the end of the course. Course projects may have been retained in subsequent semesters beyond the grant period; however, this was not a grant requirement. Annual grant awards to faculty and staff were based on a competitive proposal process, with funding decisions made by the QEP Committee. Faculty conducting the most promising projects were also recognized each year with the QEP Excellence Award for Innovative Instruction. Our annual budget starting in the 2006-2007 academic year and continuing until the 2012-2013 academic year was $50,000, with about 15 projects funded annually. For the 2013-2014 and 2014-2015 academic years, our annual budget was $80,000, with about 20 projects funded per year at an increased monetary level.

As described in our 2012 Fifth-Year Interim Report (Tennessee Tech University, 2012), the plan attracted participation from every college within the University. The program was successful according to several metrics, including increasing the frequency that faculty selected some of the IDEA survey objectives relevant to the QEP (specifically, "Learning to apply course material" and "Acquiring skills in working with others as a member of a team"), improving results on certain QEP-related NSSE survey questions, and improving results on the CAT for students who participated in grant-enriched courses. On the other hand, the frequency at which faculty selected several of the IDEA survey objectives relevant to the QEP did not improve, nor did the responses by students to some key QEP-related NSSE survey questions. These matters are described more thoroughly below.

An objective review of this program shows opportunities for improvement, such as providing more concentrated administrative oversight, providing dedicated clerical support, and, in general, leveraging other institutional resources in support of the QEP goals. Also, in order to strive for continual improvement and to make lasting change, courses should be tracked for several iterations, and consultations

should be held with faculty. In addition, one recommendation made in the 2012 Fifth-Year Interim Report (Tennessee Tech University, 2012) was that workshops to promote faculty development would be beneficial to improve teaching and learning. Our QEP addresses this recommendation in part by collaborating with our new Center for Teaching and Learning Excellence (CTLE), which will disseminate effective teaching practices throughout the University. This facet of our QEP, as well as other improvements to our current curriculum grant program, is discussed in Ch. VI.

Tennessee Tech's Critical Thinking Assessment Test (CAT)

Tennessee Tech is in a unique position to successfully address issues related to creative inquiry. For the past 15 years, Tennessee Tech's Center for Assessment and Improvement of Learning, with support from the National Science Foundation (NSF), has been involved in an extended effort to develop, refine, and nationally disseminate an instrument to assess those components of critical thinking and problem solving that faculty across disciplines think are most important (Stein & Haynes, 2011). The CAT was developed by faculty with input from a wide variety of institutions and disciplines, with guidance from cognitive/learning sciences and assessment to both assess and engage faculty in efforts to improve student learning. Higher order thinking skills assessed by the CAT instrument include evaluating information, creative thinking, problem solving, and communication. Tennessee Tech has collaborated on the CAT instrument with over 235 diverse institutions, ranging from community colleges to Ivy League institutions, with schools oriented toward the liberal arts or STEM disciplines. In the process, Tennessee Tech has become established as a nationally recognized center for critical-thinking assessment and improvement.

Many institutions are using the CAT as part of their QEP plan. Various institutions are also using the CAT as a model to help faculty understand how to develop better course assessments that encourage students to develop the kinds of critical-thinking skills that are relevant in their

disciplines. As such, the CAT instrument serves as a useful assessment tool and also provides an opportunity for faculty development that can contribute to improved student learning.

Student responses on the CAT are scored by an institution's own instructors. Workshops to train instructors on scoring the CAT are held at various locations throughout the country and are typically led by Dr. Kevin Harris, Associate Director of the Tennessee Tech Center for Assessment and Improvement of Learning and QEP Committee member. Scoring results at other institutions are checked for accuracy by faculty and staff at Tennessee Tech. Since its development in the 2001-2002 academic year, nearly 100 scoring sessions have been held on the Tennessee Tech campus, involving faculty from departments as diverse as Counseling and Psychology, Civil and Environmental Engineering, Communication, Chemical Engineering, Decision Sciences and Management, Curriculum and Instruction, English, Sociology and Political Science, Foreign Languages, Chemistry, History, Biology, and Journalism.

URECA!

As stated in Ch. II and explained further in Ch. VI, we propose to scaffold student development in creative inquiry with a three-tiered system: Tier 1 will introduce students to foundational skills; Tier 2 will encourage students to utilize these foundational skills and to engage in creative inquiry; and Tier 3 will constitute a fully immersed, creative inquiry experience. We propose to build on two existing programs for the Tier 3 experience, each of which is recognized as an AAC&U high-impact practice (AAC&U, 2013): (1) undergraduate research and (2) capstone courses and projects.

For the past four years, Tennessee Tech's URECA! program has provided summer grants to students to engage in original research and creative work under the supervision of a faculty member. The funding for this program has been provided on a year-by-year basis from the Office of the Provost, as budgets have permitted. Approximately 32 grants in the amount of $3,000 were awarded for Summer 2015.
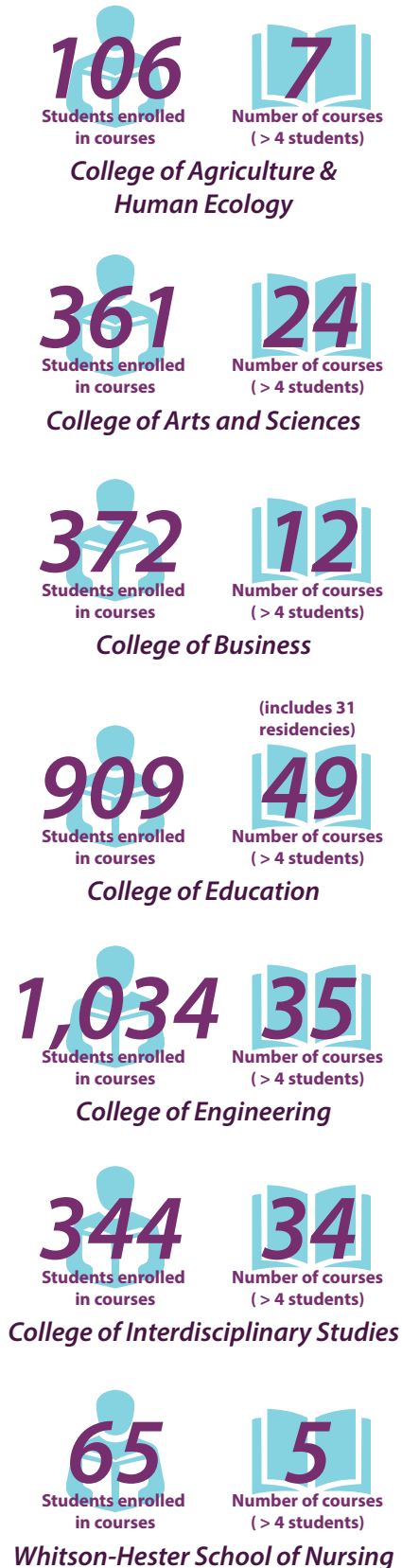
The research is clear on the beneficial impact to students engaged in undergraduate research. Students who participate in undergraduate research exceed their peers in graduation rates (Bauer and Bennett, 2003; Craney et al., 2011), academic performance (Bauer and Bennett, 2003), and graduate school attendance rates (Bauer and Bennett, 2003; Eagen et al., 2013), among other measures of academic achievement. Likewise, undergraduate researchers show superior growth in discipline-related knowledge and skills, including greater confidence in their ability to work independently and conduct research (Bauer and Bennett, 2003; Ishiyama, 2002; Landrum and Nelsen, 2002; Seymour et al., 2004), oral and written communication skills, and critical-thinking skills (Bauer and Bennett, 2003; Seymour et al., 2004; Lopatto, 2007).

EDGE will incorporate the undergraduate summer research program, which is currently part of URECA!, as a Tier 3 creative inquiry experience. Doing so is expected to provide these benefits: (1) the thousands of students who engage in a Tier 2 creative-inquiry-enriched course yearly (see Table 6.2) will be better informed and more interested in participating in a Tier 3 summer experience; (2) as a result of greater interest, the overall quality of the program will increase; (3) learning creative inquiry skills in a Tier 2 course will better prepare students for a Tier 3 immersive summer experience, although such progression is not required; and (4) with the firm commitment of university resources, it will be possible to make long-term plans for the program.

Capstone and Research in the Major Courses

Capstone courses and research-based courses for seniors are extensive at Tennessee Tech, as shown in Table 3.1. These culminating experiences are also a greater part of our culture compared to our peer institutions, as evidenced by results from the 2014 NSSE Survey: 55 percent of senior Tennessee Tech students versus 43 percent of seniors at our Carnegie class peers reported that they had, or planned to, complete such an experience. Our QEP will provide Tennessee Tech students the opportunity to excel

TABLE 3.1
Culminating Experiences for Seniors (AY 2014-2015).

106 Students enrolled in courses | **7** Number of courses (> 4 students)
College of Agriculture & Human Ecology

361 Students enrolled in courses | **24** Number of courses (> 4 students)
College of Arts and Sciences

372 Students enrolled in courses | **12** Number of courses (> 4 students)
College of Business

909 Students enrolled in courses | **49** Number of courses (> 4 students) (includes 31 residencies)
College of Education

1,034 Students enrolled in courses | **35** Number of courses (> 4 students)
College of Engineering

344 Students enrolled in courses | **34** Number of courses (> 4 students)
College of Interdisciplinary Studies

65 Students enrolled in courses | **5** Number of courses (> 4 students)
Whitson-Hester School of Nursing

in these courses through scaffolded learning experiences in their prior courses, in accordance with one of the recommendations of the Boyer Commission (1998): "The course should be the culmination of the inquiry-based learning of earlier course work, broadening, deepening, and integrating the total experience of the major."

3.2 ASSESSMENT DATA

3.2.1 National Survey of Student Engagement

As mentioned in Ch. II, an initial review of institutional data was conducted by Tennessee Tech's QEP Committee from November 26, 2013, to March 18, 2014. At the Nov. 26, 2013, committee meeting, results from the most recent NSSE survey data available (2011) at the time were distributed to the committee and discussed. Later in 2015, data from the 2014 NSSE became available for review. An analysis of NSSE survey data guided the selection of our topic, by revealing the existing strengths of our program as well as opportunities for growth. For example, the 2014 results indicated self-reported student success on a number of measures related to creative inquiry. Specifically, senior Tennessee Tech students reported that, on average, they "often," rather than "sometimes," combined ideas from different courses when completing assignments, an increase of 0.5 units on this

4-point scale compared to the freshman response (Table 3.2). Seniors also reported that coursework slightly more than "often" emphasized applying facts, theories, or methods to practical problems or new situations, an increase of 0.33 over their first-year response. And, in response to the question "How much has your experience at this institution contributed to your knowledge, skills, and personal development in thinking critically and analytically?" students responded 0.30 units higher in their senior year than in their first year, answering slightly higher on average than "Quite a bit."

Our program for undergraduate research and creative activities, URECA!, is also a solid platform on which to build QEP co-curricular student opportunities, as shown by the growth of participation in undergraduate research since 2006 and particularly since 2011 (Fig. 3.1). Providing undergraduate research opportunities is Goal 3f of our strategic plan, Flight Plan: Focused for the Future (Tennessee Tech University, 2015b), and integrating our undergraduate research and creative activity program with other elements of our QEP such as a multi-tiered curriculum grant program, as explained in Ch. VI, will facilitate this goal. The divergence between us and our Carnegie peers in the Master's, Large category from 2011 to 2014 also indicates that we are in the process of distinguishing Tennessee Tech from our

TABLE
3.2

NSSE 2014 First Year Student and Senior Responses.*

NSSE Question	First year students	Seniors	Growth
2a. During the current school year, about how often have you combined ideas from different courses when completing assignments?	2.57	3.07	+0.50
4b. Applying facts, theories or methods to practical problems or new situations.	2.91	3.24	+0.33
17c. How much has your experience at Tech contributed to your knowledge, skills and personal development: thinking critically and analytically?	2.97	3.27	+0.30

**Based on 4 point Likert scale: 1=Never, 2=Sometimes, 3=Often, 4=Very often*

peer institutions in this area, which will further Flight Plan Goal 3a: Create Distinctive Programs and Invigorate Faculty: Expand research and faculty scholarly activity. Finally, a continued and increased commitment to this area will also enable Tennessee Tech to meet Flight Plan Goal 1a: Improve Undergraduate Student Experience: Enhance quality of undergraduate student experience.

Our students also collaborate to a greater degree across a broad range of learning activities compared to their Carnegie peers in the Master's, Large category (Table 3.3). Numerous studies have shown that higher order thinking and greater depth of thought is more likely to flourish in environments where collaborative learning is part of the culture compared to those settings where students tend to be more intellectually

FIG.
3.1
Responses of Seniors to the NSSE 2014 Question: "Which of the following have you done or do you plan to do before you graduate?: Work with a faculty member on a research project."
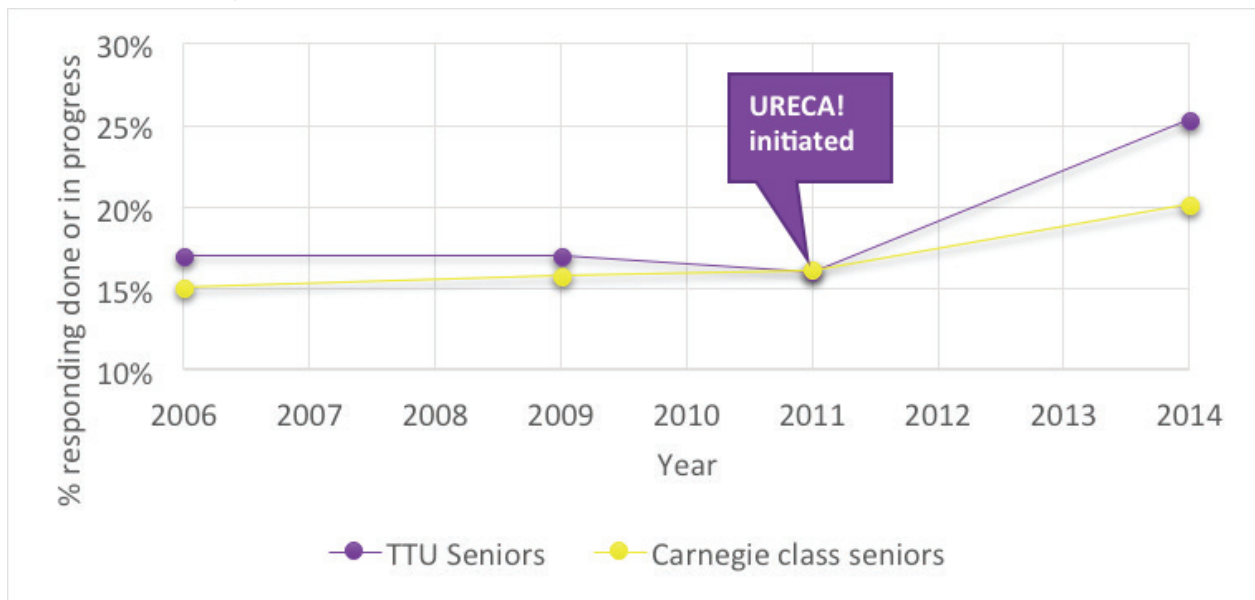
TABLE
3.3
Responses of Seniors to the NSSE 2014 Question: "During the current school year, about how often have you done the following?"*

NSSE Question	TTU	Carnegie	Difference
1e. Asked another student to help you understand course material.	2.62	2.35	+0.27
1f. Explained course material to one or more students.	2.90	2.70	+0.20
1g. Prepared for exams by discussing or working through course material with other students.	2.75	2.41	+0.34
1h. Worked with other students on course projects or assignments.	3.08	2.82	+0.26

Based on 4 point Likert scale: 1=Never, 2=Sometimes, 3=Often, 4=Very often

isolated from their peers (Johnson et al., 1998a; 1998b; Springer et al., 1999). Such interactions allow for the possibility for students to learn new ideas from each other, both discipline-related as well as real-life ideas, as stated by Kuh (2008): "Collaborative learning combines two key goals: learning to work and solve problems in the company of others, and sharpening one's own understanding by listening seriously to the insights of others, especially those with different backgrounds and life experiences."

The data also indicated opportunities for improvement in creative inquiry-related areas. For example, our first-year and senior students lag behind their Carnegie peers in their opportunities to evaluate a point of view, decision, or

information source; there is minimal growth from their first year to their senior year in this area (Table 3.4).

Also, our seniors did not match their Carnegie peers with respect to (a) examining the strengths and weaknesses of their own views, (b) attempting to better understand others' views, (c) learning something that changed the way they understood an issue, (d) connecting ideas from their courses to prior experiences and knowledge, and (e) identifying key information from reading assignments (Table 3.5). One interesting point is that although our students collaborate to a greater degree than their peers (Table 3.3), which provides the opportunity to learn new ideas from each other, they have not benefitted from this

TABLE 3.4 Responses to NSSE 2014 Question 4d: "During the current school year, how much has your coursework emphasized the following?"*

NSSE Question		TTU	Carnegie
4d. Evaluating a point of view, decision or information source.	FY	2.80	2.95
	SR	2.81	3.02

Based on 4 point Likert scale: 1=Very little, 2=Some, 3=Quite a bit, 4=Very much

TABLE 3.5 Responses of Seniors to the NSSE 2014 Question: "During the current school year, about how often have you done the following?"*

NSSE Question	TTU	Carnegie	Difference
2d. Examined the strengths and weaknesses of your own views on a topic.	2.76	2.89	-0.13
2e. Tried to better understand someone else's views by imagining how an issue looks from his or her perspective.	2.82	2.97	-0.15
2f. Learned something that changed the way you understand an issue or concept.	2.77	2.97	-0.20
2g. Connected ideas from your courses to your prior experiences and knowledge.	3.12	3.26	-0.14
9a. Identified key information from reading assignments.	3.11	3.28	-0.17

Based on 4 point Likert scale: 1=Never, 2=Sometimes, 3=Often, 4=Very often

experience as much as their peers by attempting to better understand the views of others.

An analysis of several of these items for which historical data were available indicated that the above responses are consistent with those from prior years (Appendix 5).

Likewise, senior coursework did not require them to engage in certain other aspects of creative inquiry to the extent of their peers (Table 3.6), including (a) analyzing an idea,

experience, or line of reasoning in depth by examining its parts; and (b) forming a new idea or understanding from various pieces of information. Senior coursework also did not provide as many opportunities to write to the same extent as their peers (Table 3.7).

Finally, when asked "How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?" it is seen that the experience for our students does not compare to that of

TABLE 3.6 Responses of Seniors to the NSSE 2014 Question: "During the current school year, how much has your coursework emphasized the following?"*

NSSE Question	TTU	Carnegie	Difference
4c. Analyzing an idea, experience or line of reasoning in depth by examining its parts.	3.08	3.13	-0.05
4e. Forming a new idea or understanding from various pieces of information.	2.89	3.02	-0.13

*Based on 4 point Likert scale: 1=Very little…4=Very much

TABLE 3.7 Mean Responses of Seniors to the NSSE 2014 Question: "During the current school year, about how many papers, reports, or other writing tasks of the following length have you been assigned?"

NSSE Question	TTU	Carnegie	Difference
7a. Up to 5 pages.	5.44	7.84	-2.40
7b. Between 6 and 10 pages.	2.57	3.66	-1.09

TABLE 3.8 Responses of Seniors to the NSSE 2014 Question: "How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?"*

NSSE Question	TTU	Carnegie	Difference
17a. Writing clearly and effectively.	2.83	3.09	-0.26
17b. Speaking clearly and effectively.	2.92	2.96	-0.04
17c. Thinking critically and analytically.	3.27	3.30	-0.03

*Based on 4 point Likert scale: 1=Very little, 2=Some, 3=Quite a bit, 4=Very much

students at our peer institutions with respect to several creative inquiry aspects (Table 3.8). A historical analysis showed that these responses were not aberrations (Appendix 5).

An analysis of several of these items for which historical data were available since the inception of our original QEP indicates that there has been positive change for some items, little or no change for some, and negative change for others (Table 3.9). For example, more freshmen engaged in collaborative learning and almost 20% more students engaged in culminating senior experiences in 2014 compared to 2005. On the other hand, both freshmen and seniors engaged in critical analysis to a lesser extent in 2014 than in 2005, according to their response to question

4c, "Analyzing an idea, experience or line or reasoning in depth by examining its parts." And overall, for both freshmen and seniors, there has been minimal or negative change with respect to writing or speaking clearly and effectively, and thinking critically and analytically, since 2005.

Taken together, the NSSE data from 2005 to 2014 showed that we have existing strengths in some creative inquiry-related learning domains as well as opportunities for improvement. On the one hand, our students have engaged in undergraduate research and capstone classes more than their peers. We also have a culture that has embraced collaborative learning to a greater extent than our peers, which might be attributed to our original QEP with teamwork skills as one

TABLE
3.9

Historical NSSE Data for Tennessee Tech Freshmen and Seniors.

NSSE survey item	Freshmen			Seniors		
	2005	2014	Change	2005	2014	Change
1h. Worked with other students on course projects or assignments.	2.34	2.67	+0.33	3.01	3.08	+0.07
2a. Combined ideas from different courses when completing assignments.	2.33	2.57	+0.24	2.96	3.07	+0.11
2d. Examined the strengths and weaknesses of your own views on a topic.	2.45	2.64	+0.19	2.70	2.76	+0.06
4c. Analyzing an idea, experience or line of reasoning in depth by examining its parts.	3.00	2.86	-0.14	3.20	3.08	-0.12
9f. Complete a culminating senior experience (capstone course, senior project or thesis, portfolio, etc.).	2.0%	3.6%	+1.6%	35.0%	54.6%	+19.6%
17a. How much has your experience at Tech contributed to your writing clearly and effectively?	3.05	2.73	-0.32	2.91	2.83	-0.08
17b. How much has your experience at Tech contributed to your speaking clearly and effectively?	2.74	2.57	-0.17	3.02	2.92	-0.10
17c. How much has your experience at Tech contributed to your thinking critically and analytically?	3.10	2.97	-0.13	3.26	3.27	+0.01

foci. On the other hand, historical data shows that there has been negative or negligible change since 2005 with respect to the development of our students' critical and analytical thinking and communication skills. In sum, this data presents an opportunity to enhance student learning in the area of creative inquiry, but with a program that recognizes and corrects the shortcomings in our original QEP.

3.2.2 IDEA Teaching Evaluations

Student course evaluations at Tennessee Tech are conducted using the IDEA teaching evaluation system developed at Kansas State University. Instructors have flexibility in deciding how their courses are evaluated by selecting from a set of 12 learning goals, which are summarized below:

- gaining factual knowledge (terminology, classifications, methods, trends)
- learning to apply course material (to improve thinking, problem solving, and decision making)
- learning fundamental principles, generalizations, or theories
- developing specific skills, competencies, and points of view needed by professionals in the field
- learning how to find and use resources for answering questions or solving problems
- learning to analyze and critically evaluate ideas, arguments, and points of view
- developing skill in expressing myself orally or in writing
- acquiring skills in working with others as a member of a team
- acquiring an interest in learning more by asking my own questions and seeking answers
- gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
- developing a clearer understanding of, and commitment to, personal values
- developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)

Students evaluate their progress on each of these goals, but only the goals that instructors have identified as important or essential to the course are factored into assessment (essential goals are weighted twice as much as important goals). Tennessee Tech has been tracking institutional performance on these evaluations since 1994 and regularly posts analyses of these data on our website. For our analysis, we considered two types of assessment information that can be derived using the IDEA evaluation system:

- information about the relative frequency that different teaching goals are selected by faculty on a campus-wide basis
- information about how much progress students believe they made on each goal, in the form of an adjusted score that accounts for students' self-reported motivation and work habits

The graphs below illustrate institutional patterns over multi-year periods related to each of these measures. Fig. 3.2 shows the percent of responses that instructors across the University selected each learning goal over the time periods of 2006 to 2010 and 2011 to 2014, using simple averages of the four IDEA evaluations in the former period and the three evaluations in the latter period. Several points are worth noting in this data:

- On a campus-wide basis, "gaining factual knowledge" is still emphasized most frequently by faculty compared to all other learning goals, but "learning to apply course material" is now second by only three percent rather than six percent.
- Faculty selected specific learning goals related to higher-order thinking and collaborative learning with greater relative frequency more recently than in the past, including learning to apply course material; learning fundamental principles, generalizations, or theories; and teamwork skills, with increases of

four percent, three percent, and three percent, respectively. Two of these, learning to apply course material and teamwork skills, were particularly relevant to our original QEP (those marked with an asterisk in Fig. 3.2).

- There has been essentially no change in the relative frequency at which faculty select many of the learning goals related to creative inquiry, including learning to find and use resources (44 percent), critical thinking (~44 percent), oral and written communication (42 percent), self-directed learning (40 percent), and developing creative capacities (~25 percent). All of these were also particularly relevant to our original QEP.

- Finally, developing creative capacities is now the least-emphasized learning goal, with only 25 percent of instructors electing to be assessed on this item.

Learning Goal

Learning Goal	2006-2010	2011-2014
Creativity*	26	25
Personal Values	24	26
Cultural	28	27
Self-Directed Learning*	40	40
Teamwork*	38	41
Communication*	42	42
Critical Thinking*	44	43
Find & Use Resources*	44	44
Professional Skills	57	59
Principles	63	66
Application*	68	72
Facts	74	75

% of respondents selecting   ■ 2006-2010   ■ 2011-2014
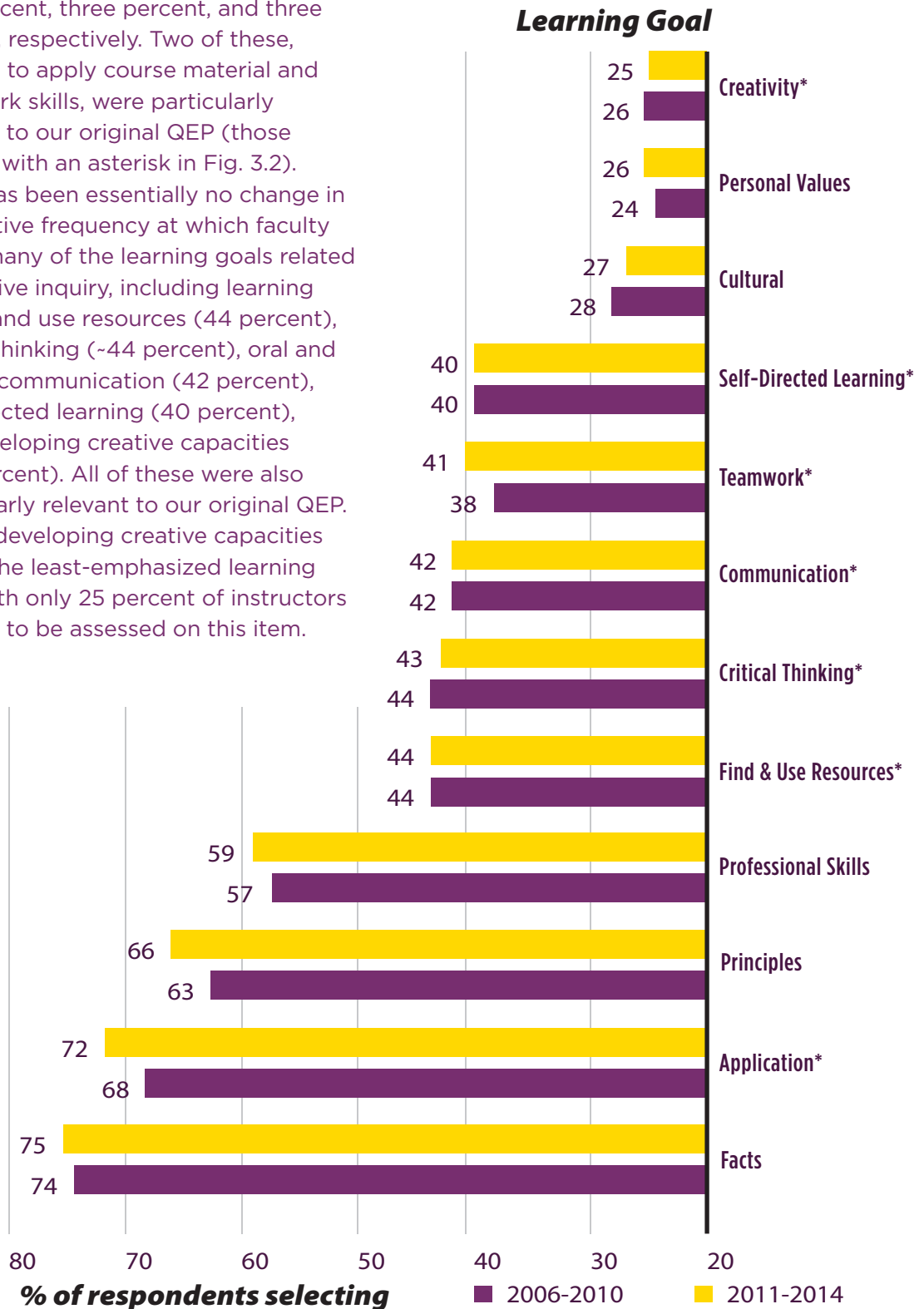
FIG.
3.2 **Relative Frequency that IDEA Objectives are Selected by Instructor (* denotes an objective particularly relevant to the original QEP).**

FIG.
3.3

Self-reported Progress on IDEA Objectives by Students (* denotes an objective particularly relevant to the original QEP).

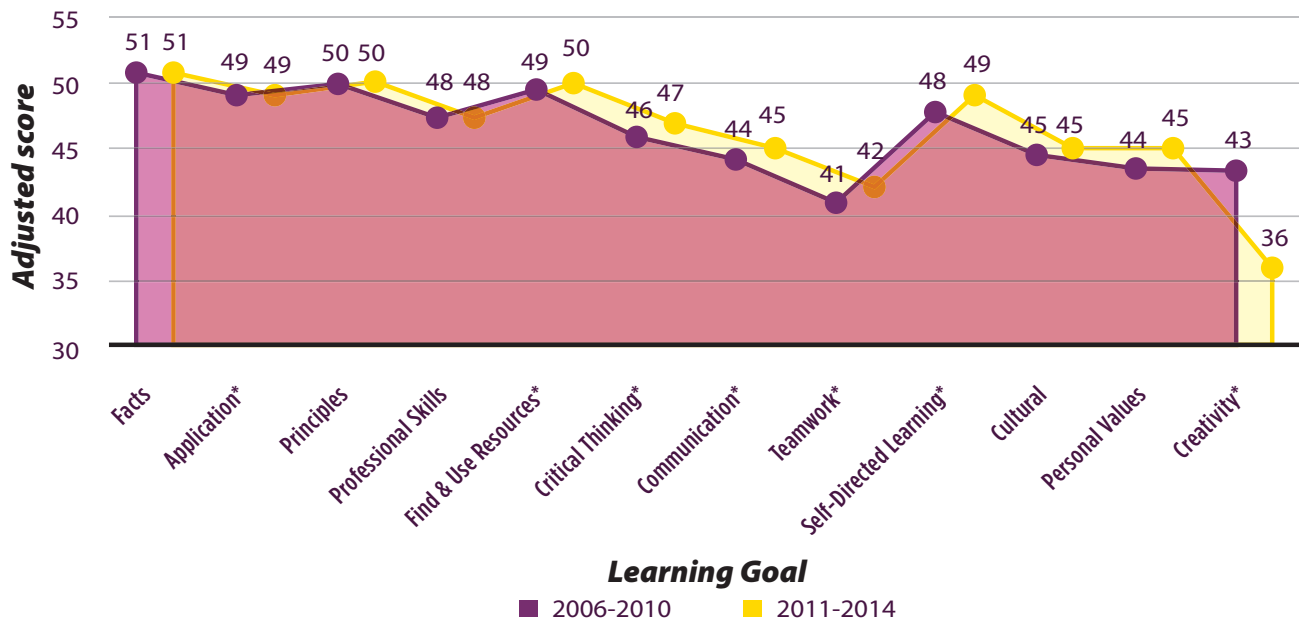**Learning Goal**

■ 2006-2010   ■ 2011-2014

Fig. 3.3 shows that there has been little change in students' self-reported progress between 2006-2011 and 2011-2014 with one exception: there has been a significant decrease in students' progress related to developing creative capacities from the early time period to the more recent time period, with a decreased adjusted score of seven points.

Considering the data presented in Figs. 3.2 and 3.3, it is apparent that (a) we have made some progress with respect to faculty emphasizing certain areas of learning involving higher order thinking while there has been little progress in other areas; (b) changes in self-reported student learning have been more or less flat, with the exception of creative thinking, which has declined. Accordingly, we have an opportunity both to increase the emphasis that faculty put on many creative inquiry-related learning areas, including developing creative capacities, and to increase student learning in these areas. Our QEP will address these findings in various ways, including coordinating efforts with a new CTLE, which will assist faculty in creating effective,

evidenced-based, learning environments. The CTLE will serve as a campus hub of information on successful teaching practices and will disseminate this knowledge in workshops, one-on-one consulting, and via other avenues. Details of this aspect of our plan are presented in Ch. VI.

3.2.3 Alumni Survey Data

In 2012, we surveyed alumni who graduated in the 2009-2010 academic year. One of the questions alumni were asked that pertains to our QEP was "Thinking back to your experience at Tennessee Tech, how much did your coursework emphasize the following mental activities?" Although not directly comparable, the responses to this question (Table 3.10) appear generally consistent with the student responses on the IDEA teaching evaluations (Fig. 3.3).

3.2.4 Employer Survey Data

Tennessee Tech Employer Survey Data

In addition to the NSSE and IDEA surveys, Tennessee Tech administered the 2013 Employer Survey to identify those areas that are most

3.10 Alumni Survey Data.*

Mental activity emphasis	Average response
Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form.	2.9
Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components.	3.2
Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships.	3.0
Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions.	2.8
Applying theories or concepts to practical problems or in new situations.	3.2

*(1-Very Little, 2-Some, 3-Quite a Bit, 4-Very Much)

important to our students' employers and to gather information about how our students perform in each of those areas (Tennessee Tech University, 2013). The 2013 survey was administered to a database of employers registered with Tennessee Tech Career Services, as it was in 2003 and 2008. Responses were received from 101 employers. Employers were surveyed on a number of topics, including these that were possible QEP topics:

- ethical awareness and ethical behavior
- problem-solving skills
- written and verbal communication skills
- lifelong learning skills
- teamwork
- critical-thinking skills
- leadership skills
- diverse perspectives and intercultural knowledge/competence

A 6-point Likert scale was used to assess the importance of these topics to employers, with possible responses ranging from strongly disagree (1 point) to strongly agree (6 points). All of these topics except for intercultural

competence were rated within 0.4 points of each other, ranging from an average of 5.4 for Leadership Skills to 5.8 for Ethical Awareness. Intercultural competence received an average rating of 5.0 points. A 5-point Likert scale was used to assess the performance of Tennessee Tech graduates on these topics, with responses ranging from Poor (1 point) to Excellent (5 points). Employer ratings were tightly clustered within 0.3 points of each other, ranging from an average of 4.0 for Intercultural Competence to 4.3 for Ethical Awareness.

Nationwide Employer Survey Data

The AAC&U commissioned Hart Research Associates to conduct a national survey of employers in 2009, 2013 and 2014. In the first survey (Hart Research Associates, 2010), employers were asked on which of 17 learning outcomes colleges should increase their current emphasis. The eight learning outcomes listed in Table 3.11 garnered at least 70 percent support.

The second AAC&U employer survey, "It Takes More Than a Major: Employer Priorities for College Learning and Student Success"

(Hart Research Associates 2013), confirmed the importance of creative inquiry to students nationwide, noting:

> Employers recognize capacities that cut across majors as critical to a candidate's potential for career success, and they view these skills as more important than a student's choice of undergraduate major.

- Nearly all those surveyed (93 percent) agreed, "a candidate's demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major."

- More than three in four employers said they want colleges to place more emphasis on helping students develop five key learning outcomes, including critical thinking, complex problem solving, written and oral communication, and applied knowledge in real-world settings.

- Employers endorsed several educational practices as potentially helpful in preparing college students for workplace success. These included practices that require students to (a) conduct research and use evidence-based analysis; (b) gain in-depth knowledge in the major and analytic, problem-solving, and communication skills; and (c) apply their learning in real-world settings (p. 1).

TABLE 3.11 Hart Research Associates (2010) Employer Survey Results.

Learning Outcome	%
The ability to effectively communicate orally and in writing.	89
Critical thinking and analytical reasoning skills.	81
The ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences.	79
The ability to analyze and solve complex problems.	75
The ability to connect choices and actions to ethical decisions.	75
Teamwork skills and the ability to collaborate with others in diverse group settings.	71
The ability to innovate and be creative.	70
Concepts and new developments in science and technology.	70

A key finding of the most recent AAC&U employer survey, "Falling Short? College Learning and Career Success" (Hart Research Associates, 2015), was that "When hiring recent college graduates, employers say they place the greatest priority on a demonstrated proficiency in skills and knowledge that cut across majors. Written and oral communication skills, teamwork skills, ethical decision-making, critical thinking skills, and the ability to apply knowledge in real-world settings are the most highly valued among the 17 skills and knowledge areas tested."

3.2.5 Assessment Summary

A holistic analysis of the data presented in this section provides support for a plan to improve our students' communication abilities and higher order thinking skills including critical thinking, problem solving and creative thinking. Evidence in support of improved learning in these areas comes from NSSE data (Tables 3.4, 3.5, 3.6, 3.7, 3.8, 3.9), IDEA teaching evaluation data (Figs. 3.2, 3.3), Tennessee Tech employer survey data, and nationwide employer survey data (Table 3.11). These subjects also ranked highest in the faculty, staff, student, alumni and employers QEP topic survey (Table 2.2).

IV. STUDENT LEARNING OUTCOMES

4.1 DEFINITION OF CREATIVE INQUIRY

Tennessee Tech University has recognized the need to develop and improve students' capacities to create original intellectual or creative products through creative inquiry. This need emerged from an evaluation of institutional data including NSSE, employer, and alumni surveys, which were shared in the previous chapter. Our definition of "creative inquiry" is

> The process of exploring issues, objects or works through the collection and analysis of evidence including combining or synthesizing existing ideas, products, or expertise in original ways to answer an open-ended question or achieve a desired goal.

Through conversations among Tennessee Tech faculty and QEP Committee members, it became clear that the QEP topic must extend across all fields of study and incorporate those skills that transcend disciplines. Our definition allows for each academic area to tailor questions and goals to their field while providing ample opportunity to assess a set of underlying student outcomes. Students are also free to engage in very diverse topics of inquiry that allow for multiple perspectives, backgrounds, and abilities.

4.2 STUDENT LEARNING OUTCOMES

The QEP Committee members recognize that while the QEP topic allows for broad application to all academic disciplines, there is a set of specific skills that underlies this process. We found the universal model of inquiry presented by Levy et al. (2010) (Fig. 4.1) consistent with the material presented in the previous two chapters and valuable in crafting our student learning outcomes. Five components of the inquiry cycle are presented:

1. Students or instructors establish a question, problem, or theme for investigation.
2. Students draw on their existing knowledge and with support from their instructor or others, decide on the direction and methods of their inquiry.
3. Students explore evidence, interrogate texts, conduct experiments, etc., interacting with information via a range of sources.
4. Students reflect, discuss, critique, analyze, conceptualize, synthesize, create, and receive feedback.
5. Students communicate and share results of their inquiry.

FIG.
4.1

An Inquiry Cycle (from Levy et al., 2010).

Students communicate and share results of their inquiry

Students/tutors establish question, problem, theme

Students reflect, discuss, critique, analyze, conceptualize, synthesize, create, receive feedback

Students draw on their existing knowledge and, with support, decide on the direction and methods of their inquiry

Students explore evidence, interrogate texts, conduct experiments, etc., interacting with information via a range of sources

Several modifications were made to the components of the cycle in formulating our SLOs. These adjustments were made in order to (1) make implied concepts explicit, (2) clarify specific components, or (3) better address our unique campus environment. One modification regarded the ability of our students to use digital information search tools to find and evaluate good sources of information, skills that are vital to successful inquiry (Hepworth and Walton, 2009, p. 82; Levy et al., 2010; McKinney, 2014). This foundational component is not shown explicitly in the cycle but is implied in several. Another change involved the third component of the cycle: "Students explore evidence, interrogate texts, conduct experiments, etc., interacting with information via a range of sources." This component was unpacked into two separate components: the ability to collect relevant information and the ability to assess information. Finally, the fourth component was modified to better suit our campus: critical thinking may

be the key element of this component for some disciplines, while creative thinking may be the key element for others. Giving faculty the option to choose either of these will better suit specific disciplinary foci. In consideration of these items, we have reached consensus on the student learning outcomes listed in Table 4.1 for EDGE.

Similar SLOs, with a focus on inquiry, research, or student scholarship, have been identified in the QEPs of other institutions, including The University of Houston, Florida Atlantic University, and George Mason University. These outcomes will lay the foundation for each of the courses funded by the Creative Inquiry Curriculum Grant Program presented in Chapter VI.

4.3 PROGRAM GOALS

To promote creative inquiry throughout a student's four-year experience at Tennessee Tech, we plan on expanding existing programs and beginning several new ones. The four goals of our QEP are to

1. establish an undergraduate curriculum that encourages student success in creative inquiry
2. expand student co-curricular opportunities for undergraduate creative inquiry
3. support and acknowledge faculty and students who engage in creative inquiry
4. develop the infrastructure to support undergraduate creative inquiry

4.4 PROGRAM OUTCOMES

To evaluate the success of EDGE, we have established the following program outcomes, which will aid in the evaluation of the program goals listed above.

TABLE
4.1 EDGE Student Learning Outcomes.

1. Students will effectively use digital information search tools.

2. Students will formulate a creative inquiry question or problem.

3. Students will explore a creative inquiry question or problem.

   3.1 Choose an appropriate discovery process to address the problem.

   3.2 Collect information relevant to the problem.

   3.3 Assess collected information in a discipline appropriate manner.

4. Students will create an original scholarly or creative project.

   4.1 Applying critical thinking skills and/or

   4.2 Applying creative thinking skills.

5. Students will communicate their findings/creations/art/inventions in a discipline appropriate manner.

TABLE
4.2 EDGE Program Outcomes.

1. Undergraduate programs offer opportunities for creative inquiry.

2. Faculty support undergraduate students in creative inquiry activities.

3. Students participate in creative inquiry activities.

4. Students have opportunities to communicate/disseminate the results of their creative inquiry activities.

5. Students who have participated in creative inquiry activities are prepared for their career goals and advanced study.

V. LITERATURE REVIEW AND BEST PRACTICES

5.1 INQUIRY

As described in the preceding chapters, we have identified a promising topic for our QEP and developed specific SLOs. This chapter will review the relevant literature to identify the educational practices and institutional conditions that foster creative inquiry and the SLOs that we have developed. Our overall goal is to create a culture of undergraduate creative inquiry (CI) through increased involvement in, and recognition of, creative inquiry classroom and co-curricular activities. As stated in Ch. II, we define creative inquiry as

> The process of exploring issues, objects or works through the collection and analysis of evidence including combining or synthesizing existing ideas, products, or expertise in original ways to answer an open-ended question or achieve a desired goal.

Our definition is founded on learning via inquiry, and accentuates creativity, which is partly the art of discovering connections, in the inquiry process. Inquiry-based learning (IBL), inquiry-guided learning (IGL), or simply "inquiry," has been implemented in various incarnations, but its main feature is the promotion of active learning "through guided and increasingly, independent investigation of complex questions and problems, often for which there is no single answer" (Lee, 2004, p. 9). Levy et al. (2010) provide a useful characterization of IBL:

> 'IBL' describes a cluster of strongly student-centered learning and teaching approaches in which students' inquiry or research drives the learning experience. Students conduct small- or large-scale inquiries that enable them to engage actively with disciplinary or interdisciplinary questions and problems. Learning takes place through an emergent process of exploration and discovery. Guided by subject specialists and those with specialist roles in learning support, students use the scholarly and research practices of their disciplines to move towards autonomy in creating and sharing knowledge.

They note that IBL is also often characterized by students learning cooperatively in groups, using critical and creative thinking to explore existing knowledge and construct new knowledge.

Levy et al. (2010), drawing upon the work of Justice et al. (2002), modeled inquiry as a cycle (Fig. 4.1), with one pass of the cycle leading to new interests and more questions. Justice et al. (2002) state that reflection is a product of the process as well as "an enabler of success at every stage."

Various forms of IBL have been delineated based on whether the student or instructor/tutor designs the different components of the cycle. Buck et al. (2008), for example, defined different types of inquiry in the laboratory sciences considering the following components: (1) developing a question, (2) gaining background knowledge, (3) developing the experimental procedure, (4) designing appropriate analyses of the results, (5) developing an appropriate communication process, and (6) drawing conclusions from their findings. They created a rubric to characterize four types of inquiry, plus simple confirmation: (1) structured, (2) guided, (3) open, and (4) authentic (Table 5.1). At the "confirmation level," the instructor or tutor provides all six components to the student. This level can serve as an introduction to the process of inquiry to students. At the "guided level," the instructor provides significant scaffolding for inquiry by providing the problem,
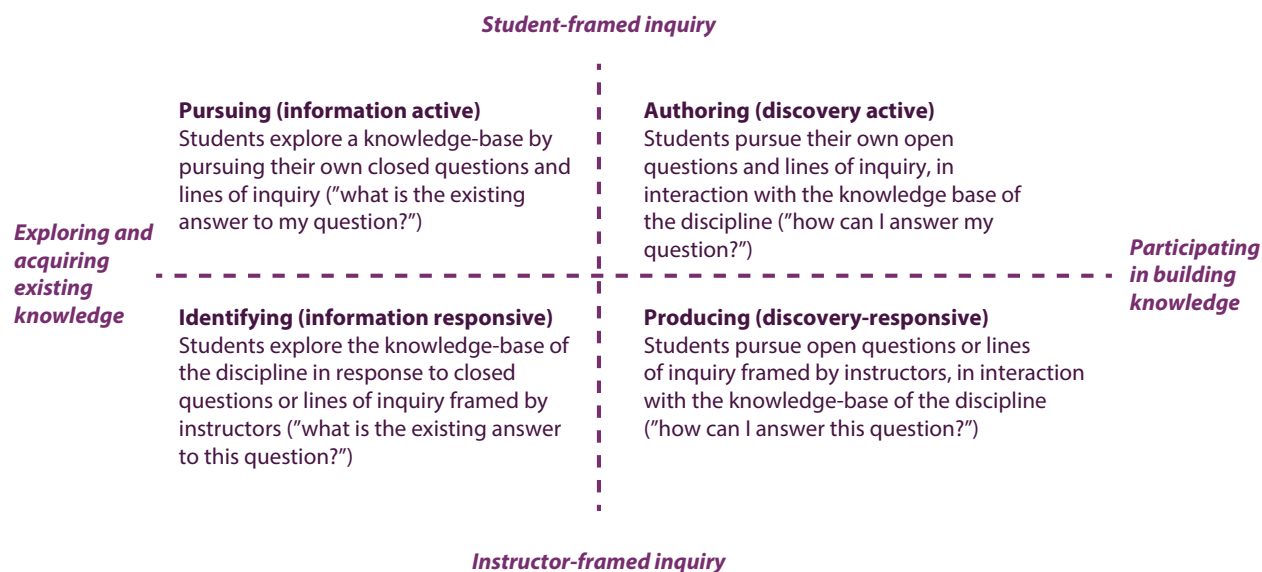
background, and procedures, with students responsible for analyzing the data, drawing defensible conclusions from the evidence, and communicating their findings. At the "authentic inquiry level," students are responsible for designing all components. The latter is the type of inquiry in which academic researchers engage and an aspirational goal for our students.

Other important considerations for IBL are (1) whether it is oriented towards (a) students learning about existing knowledge or (b) towards the production of knowledge that would be new to the discipline, and (2) the source of the inquiry question, i.e., either the (a) instructor or (b) student (Levy et al., 2011; Healey and Jenkins, 2009). Combining these two dimensions results in a matrix with four modes of inquiry (Fig. 5.1). Levy et al. (2011) note that "all four IBL modes are

TABLE

5.1

A Rubric to Characterize Inquiry in the Undergraduate Laboratory (from Buck et al., 2008).

Characteristic	Level 0: Confirmation	Level 1/2: Structured Inquiry	Level 1: Guided Inquiry	Level 2: Open Inquiry	Level 3: Authentic Inquiry
Problem/question	Provided	Provided	Provided	Provided	Not provided
Theory/background	Provided	Provided	Provided	Provided	Not provided
Procedure/design	Provided	Provided	Provided	Not provided	Not provided
Results analysis	Provided	Provided	Not provided	Not provided	Not provided
Results communication	Provided	Not provided	Not provided	Not provided	Not provided
Conclusions	Provided	Not provided	Not provided	Not provided	Not provided

FIG

5.1

Modes of IBL (Healey and Jenkins, 2009; Levy et al., 2011).

Student-framed inquiry

Pursuing (information active)
Students explore a knowledge-base by pursuing their own closed questions and lines of inquiry ("what is the existing answer to my question?")

Authoring (discovery active)
Students pursue their own open questions and lines of inquiry, in interaction with the knowledge base of the discipline ("how can I answer my question?")

Exploring and acquiring existing knowledge

Participating in building knowledge

Identifying (information responsive)
Students explore the knowledge-base of the discipline in response to closed questions or lines of inquiry framed by instructors ("what is the existing answer to this question?")

Producing (discovery-responsive)
Students pursue open questions or lines of inquiry framed by instructors, in interaction with the knowledge-base of the discipline ("how can I answer this question?")

Instructor-framed inquiry

presumed to be equally valuable, depending on the educational purpose and context."

Spronken-Smith and Kingham (2009) point to another component for consideration: the time scale of a student's engagement in an inquiry task. IBL might be adopted as the framework for an entire course, such as a senior design project in any discipline or a mathematics course taught using the Modified Moore Method (Chalice, 1997). Alternatively, an instructor may choose to include selected parts of the inquiry cycle in a course in order to develop research skills and critical thinking, in which case only a few class meetings might be devoted to inquiry. At the other end of the spectrum, a student might participate in an intensive IBL experience over the course of several semesters, for example, in a faculty-mentored research project.

Variants of inquiry-based learning include problem-based learning (PBL) and case-based learning (CBL), according to Spronken-Smith et al. (2008). These researchers classify PBL and CBL as structured or guided forms of IBL, with PBL a subset of IBL, and CBL a subset of PBL. IBL or variants have been implemented in a variety of disciplines including the behavioral/social sciences (Longmore et al., 1996; Scheel, 2002; Atkinson and Hunt, 2008; Rusche and Jason, 2011), natural sciences (Farrell et al., 1999; Berg et al., 2003; Dunne et al., 2014; Poteracki et al., 2015; Collison et al., 2012), applied sciences (Buch and Wolff, 2000; Cleverly, 2003; Bebb and Pittam, 2004; Boxall and Tait, 2008; Holaday and Buckley, 2008), business, (Laditka and Houck, 2006; Stinson and Milter, 1996; Bonk and Smith, 1998), humanities (Kramer and Arnold, 2004; Malinowski, 2004; Luke, 2006; Slatta and Atkinson, 2007; van Oostrum et al., 2007) and education (Ewing et al., 2003; Harlen and Doubler, 2004; Leiken and Rota, 2006).

Aditomo et al. (2011) illustrate the broad spectrum of IBL in practice. These researchers surveyed 224 university instructors and classified IBL tasks into eight categories, as described below:

1. Scholarly research: students formulated the question, and collected and analyzed data to make conclusions.
2. Simplified research: instructors typically provided the question, methods, and analytical procedures; students collected and analyzed data to make conclusions.
3. Literature-based inquiry: students conducted a review of the literature pertaining to a given topic and presented their results in writing.
4. Discussion-based inquiry: students conducted a review of the literature pertaining to a given topic and presented their results in a discussion, e.g., a debate.
5. Applied research: similar to simplified research, but questions concern practical issues or problems.
6. Simulated applied research: "case-based" or "problem-based" learning tasks; similar to applied research, but the data or scenario to be analyzed is simulated.
7. Enactment of practice: inquiry learning is grounded in practice or fieldwork; students typically provide service to real or simulated clients.
8. Role playing: simulated enactment of practice.

IBL is consistent with the call made by Hodge et al. (2008), as cited by Healey and Jenkins (2009), to shift undergraduate education from an "instructional paradigm that emphasizes telling students what they need to know" to a "discovery paradigm that encourages students to seek and discover new knowledge." Healey and Jenkins (2009) similarly state that by engaging students in research and inquiry, students become "producers, not just consumers of knowledge." They also note that engaging students in research and inquiry is one of the most effective ways to improve the connection between teaching and discipline-based research, a point made by the Boyer Commission (1998) when they concluded that undergraduate education must become integrated with the scholarly pursuits of the faculty.

5.2 STUDENT LEARNING OUTCOMES

5.2.1 SLO 1: Students Will Effectively Use Digital Information Search Tools

As developing scholars, it is essential for students to be able to find and evaluate high-quality informational sources. Thus, our first SLO focuses on building information literacy with the use of digital information search tools. The American Library Association defines information literacy as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library Association, 2000, p. 2). These abilities are not only critical for success as students, but they are also critical for success as lifelong learners in a society where information of varying quality is widely available (Johnston & Webber, 2003; McKinney & Levy, 2006). According to Hepworth and Walton (2009), information literacy supports inquiry-based learning by helping learners

- understand subject matter
- learn when, where, and why to use information
- recognize meaningful patterns of information
- develop adaptive expertise
- become metacognitive about their learning so that they can assess their own progress and continually identify and pursue new learning goals
- develop the ability to teach themselves (p. 8)

These six principles were identified by Bransford et al. (1999) as principles that lead to the development of expertise in a field.

McKinney (2014) described a comprehensive attempt to integrate information literacy with inquiry-based learning at the University of Sheffield. Through an evaluation of over 100 projects across the University, she summarized their major findings in this way:

- Information literacy needs to be explicitly described to students and based on an explicit model (e.g., Seven Pillars of Information Literacy [Andretta, 2005]).
- Information literacy is discipline-specific and should be taught as such.
- Peer support is especially effective in learning information literacy skills.
- Students may not recognize the importance of information literacy unless they are specifically asked to reflect on and discuss its value.

Emphasizing discipline-specific information literacy, therefore, should help pave the way toward any of the modes of inquiry presented in Fig. 5.1: toward what Levy et al. (2011) termed "inquiry for knowledge building" or "inquiry for learning," or what Healey and Jenkins (2009) termed "participating in building knowledge" or "exploring and acquiring existing knowledge."

5.2.2 SLO 2: Students Will Formulate a Creative Inquiry Question or Problem

After students are familiar with the language of a discipline, the types of questions asked in that discipline, and quality of information sources available in that discipline, they should be able to develop their own questions or problems. This important step directs the rest of the inquiry process but serves other important functions as well. After an exhaustive review of the literature related to student questions, Chin and Osborne (2008) explained that student-generated questions can provide diagnostic information to teachers about their level of understanding. Most importantly, Chin and Osborne found that questioning skills can be taught and that these skills lead to other benefits including improved content comprehension and higher-cognitive level questions. The instructional environment can foster good questions by using cooperative groups, an inquiry-based approach to learning, and discipline-specific published research articles. Teachers can inspire good questions by providing a supportive atmosphere, modelling good questions, and structuring tasks in a purposeful way to encourage good questions.

5.2.3 SLO3: Students Will Explore a Creative Inquiry Question or Problem

SLO 3.1 Students will choose an appropriate discovery process to address the problem.

Armed with a good question or problem, students should next be able to choose the most appropriate method for addressing the problem. The options available are obviously discipline-specific. In the natural sciences, students might choose between field studies and laboratory studies (Garton et al., 2006). In the social sciences, students might choose between an experimental design and a non-experimental design (Mitchell and Jolley, 2012). In music, students might choose the appropriate instrumental makeup of an ensemble (Miller, 2014). Regardless of the discipline, this choice is an important one as it requires students to (1) know the options available, (2) compare the advantages and disadvantages of the options, and (3) make an affirmative choice to pursue one option.

SLO 3.2 Students will collect information relevant to the problem.

This phase is perhaps the most important one as students physically encounter their question or problem. At this point, students use the same strategies, methodologies, and tools as the professional scholars in their discipline. They also face the same challenges and dilemmas as their professional counterparts. There are several key elements in this phase that prepare students to ultimately engage in what Buck et al. (2008) termed "authentic inquiry" or what Levy et al. (2011) termed "authoring." First, student learning will benefit from "identical elements." Students will be able to transfer their learning to the extent that the learning situation matches the performance situation (Bransford et al., 1999). In other words, students will eventually be able to create new inquiry-based knowledge if they practice using the same set of tools and strategies. Second, this step will build student confidence in conducting authentic inquiry. Bandura (1997) explained that confidence (or self-efficacy) in a particular domain is built through modeling the behavior of others (e.g., teachers, other professional scholars).

SLO 3.3 Students will assess collected information in a discipline appropriate manner.

The final step in the problem-solving phase requires students to evaluate or assess the information they have collected. This phase will also be highly discipline specific. Students in science classes might determine if the data that they have generated or been provided support a particular hypothesis. Students in a drawing or painting class might examine artistic works to better understand how other artists have used line, light, perspective, and other elements to communicate their perception of the human experience. The critical cognitive skills during this phase involve critical thinking, making appropriate inferences, and the ability to consider alternative explanations (White et al., 2011).

5.2.4 SLO 4: Students Will Create an Original Scholarly or Creative Project

When engaged in creation, students should exhibit the ability to apply critical-thinking skills in the creation of an original project and/or apply creative-thinking skills in the creation of such a project. The word "original," when used in this context, means the creation of works that are original to the student, which may or may not be original to the discipline.

SLO 4.1/4.2 Students will create an original scholarly or creative project applying critical-thinking skills and/or applying creative-thinking skills.

We agree with Levy et al. (2011) and Healey and Jenkins (2009) that the production of works resulting from inquiry in any of the four quadrants shown in Fig. 5.1 are of value, including the two that correspond to exploring and acquiring existing knowledge, i.e., identifying and pursuing. As stated before, however, our ultimate goal is for students to have "participating in building knowledge" experiences. This level represents a stage at which students have acquired the ability to make unique scholarly contributions to their disciplines. Nearly every conceptualization of inquiry-based learning concludes with such a pinnacle experience

(Pedaste et al., 2015). This peak experience is the kind envisioned in the Boyer Commission Report (1998):

> All the skills of research developed in earlier work should be marshaled in a project that demands the framing of a significant question or set of questions, the research or creative exploration to find answers, and the communication skills to convey the results to audiences both expert and uninitiated in the subject matter. When earlier course experience is inquiry-based, the student will be ready for and stimulated by the demands of this course (p. 27).

This project will serve at least three purposes. First, it validates the learning that has occurred during the earlier stages. Second, it makes a genuine contribution to the student's discipline. Finally, it signals a student's readiness to enter a profession or continue their education in graduate studies.

5.2.5 SLO 5: Students Will Communicate Their Findings/ Creations/Art/Inventions in a Discipline Appropriate Manner

With respect to SLO 1, students should be able to communicate the reasons for the search strategies they have chosen, as well as the strengths and weaknesses of various sources of information. Formulating a good question (SLO 2) is fundamentally an exercise in good communication (Chin & Osborne, 2008). Students should also be able to articulate the reasons for choosing a particular discovery process, to communicate why the information they have collected is relevant, as well as their assessment of the evidence they collect (SLO 3). With respect to SLO 4, students might communicate their creative products by presenting their work at a professional meeting or at a public exhibition. These events have been shown to help students feel like true members of the profession (Hunter et al., 2007).

5.3 OVERALL BENEFITS OF CREATIVE INQUIRY

Given the needs and strengths of Tennessee Tech identified in Chapter III, an institutional pursuit of creative inquiry is likely to have important effects across our campus. A large body of literature now exists documenting the positive effects of undergraduate research, scholarship, and creative activity. In a 2009 summary, Osborn and Karukstis found evidence that students who engaged in these activities experienced

- greater gains in mastering both content and contextual knowledge
- enhanced ability to put classroom knowledge into practice
- increased creativity and critical thinking
- enhanced problem-solving skills
- enhanced communication skills, both oral and written
- enhanced technical skills within the discipline
- greater understanding of the intersections of disciplines
- higher retention rates
- greater classroom performance
- greater persistence in the major
- higher graduation rates
- higher rates of acceptance into and enrollment in post-baccalaureate education
- increased connection to the major department and the institution
- greater participation in intellectual activities within the discipline and the intellectual life of the campus
- enhanced ability to work collaboratively with others in teams
- stronger relationships with mentors and other professionals
- deeper integration into the culture and profession of the discipline
- enhanced ability to identify and make informed decisions about appropriate career interests
- enhanced professional credentials (p. 43)

Beyond these benefits, Osborn and Karukstis also documented positive effects for faculty. Faculty who supervise undergraduate research, scholarship, and creative activity become better teachers and mentors, advance their own research agendas, and experience greater satisfaction and fulfillment. At the institutional level, there are also a number of documented benefits:

- building a community of scholars
- deepening relationships with alumni
- fostering innovation and cross-talk
- sharing a sense of purpose and achievement
- enriching an institution's curriculum
- providing opportunities to engage with the local community (pp. 46-48)

More recently, Craney et al. (2011) found many of the same benefits across a wide spectrum of disciplines.

Our QEP encourages students to pursue creative inquiry as a means for becoming scholars in their chosen disciplines. This process begins in the freshman year with the introduction of creative inquiry foundational skills and proceeds until students are able to make an original contribution to their field. This comprehensive approach will hopefully achieve the kind of education envisioned in the Boyer Commission Report:

> ...such an integrated education will produce a particular kind of individual, one equipped with a spirit of inquiry and a zest for problem solving; one possessed of the skill in communication that is the hallmark of clear thinking as well as mastery of language; one informed by a rich and diverse experience. It is that kind of individual that will provide the scientific, technological, academic, political, and creative leadership for the next century (p. 13).

VI. ACTIONS TO BE IMPLEMENTED

To promote creative inquiry throughout Tennessee Tech, we plan on expanding existing programs and beginning several new ones. The four goals of our QEP are to

1. establish an undergraduate curriculum that encourages student success in creative inquiry
2. expand student co-curricular opportunities for undergraduate creative inquiry
3. support and acknowledge faculty and students who engage in creative inquiry
4. develop the infrastructure to support undergraduate creative inquiry

This section explains the actions that will be implemented in support of each goal and will detail associated strategies.

6.1 ESTABLISH AN UNDERGRADUATE CURRICULUM THAT ENCOURAGES STUDENT SUCCESS IN CREATIVE INQUIRY

We propose a scaffolded, three-tiered program to meet this goal (Fig. 6.1). Our plan is based on best practices at other universities but has been designed to meet the distinctiveness of our institutional climate and the unique focus of our plan on creative inquiry. QEPs upon which we have drawn include those at the University of Houston, Florida Atlantic University, George Mason University, and the University of Tampa. It is consistent with recommendations from the Boyer Commission Report, Reinventing Undergraduate Education (1998), which recommends, in part: (1) constructing an inquiry-based freshman year, (2) building on the freshman foundation in the following years, and (3) culminating with a capstone experience

that demands "the framing of a significant question or set of questions, the research or creative exploration to find answers, and the communication skills to convey the results to audiences both expert and uninitiated in the subject matter."

At the Tier 1 level, first-year students will be introduced to creative inquiry foundational skills that focus on using digital information search tools. These skills include learning how to locate appropriate information resources, evaluate these resources, and ethically utilize these resources. At the Tier 2 level, students will apply their Tier 1 skills and develop other skills that will prepare them to engage in more intellectually sophisticated modes of creative inquiry. At this level, students will learn the various components of inquiry and engage in the inquiry cycle. At the Tier 3 level, students will participate in an intensive creative inquiry experience. Ideally, students would progress through all three tiers in succession but, in practice, many students may participate in only one or two of these experiences.

FIG.

6.1 EDGE Program Structure.

Tier 3/ Intensive

Tier 2/ Developing Skills

Tier 1/ Foundational Skills
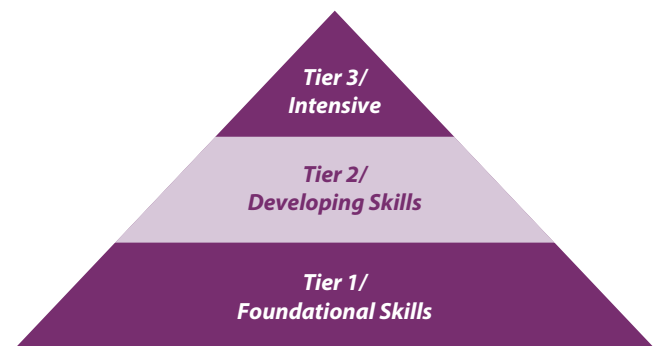
6.1.1 Tier 1: Foundational Skills

At the Tier 1 level, first-year students will be introduced to creative inquiry foundational skills. These skills focus on using digital information search tools, which are essential to successful inquiry (Hepworth and Walton, 2009, p. 82; Levy et al., 2010; McKinney, 2014). These foundational skills are especially critical due to the ever-increasing abundance of information and the ease with which information can be accessed. A study conducted by the University of Washington's Information School as part of Project Information Literacy illustrates the problems faced by digital-age freshmen, reporting that many first-year students found completing college-level research assignments both exciting and overwhelming (Head, 2013): students were excited about exploring topics that they had selected, but overwhelmed by the vast amount of information available to them. Key findings from this study included that 74 percent of freshmen struggled with selecting keywords and devising efficient search queries, 57 percent were confused by the number of irrelevant results their searches returned, and 51 percent had difficulty navigating online search technologies. Our QEP will address the challenge presented by these findings and grow our students' foundational skills to engage in creative inquiry with the aid of interactive web tutorials that we have adapted from the University of Wyoming's Tutorial for Information Power (TIP) (University of Wyoming, 2015). Like many other universities and colleges, we have been granted access to TIP under an Open Publication License. TIP is composed of five self-paced modules based on the Information Literacy Competency Standards for Higher Education (Association of College and Research Libraries, 2000). These standards were developed to teach students to (Phillips and Kearley, 2003)

1. investigate a research topic
2. use databases and the library catalog to search for information
3. locate information online or in the library
4. evaluate the quality of information
5. use the information ethically and legally in papers, speeches, or projects

Students will be introduced to these modules and given the opportunity to develop these foundational skills in UNIV 1020, University Connections; HON 1010, Introduction to Honors; or equivalent courses. As mentioned in Chapter II, these one-credit-hour courses are required of all first-year students in their first fall semester. The HON 1010 curriculum has recently been redesigned and includes intellectual inquiry, information literacy, and undergraduate research as key elements. The FYE Revitalization Committee is currently in the process of proposing changes to other FYE courses, with one proposed learning outcome stating that "students will demonstrate how to effectively evaluate information sources and utilize University libraries and information systems for academic inquiry."

The five TIP modules can be completed in one hour and are intended to complement in-class activities. Faculty will be encouraged to give students the opportunity to exercise these foundational skills by requiring a significant research project as part of their course. Two sections of HON 1010, Introduction to Honors, piloted this part of our plan in Fall 2015. In Fall 2016, we will expand this to all sections of HON 1010, and in Fall 2017, all sections of UNIV 1020 or equivalent will be included. Currently, there are 14 sections of HON 1010 and over 100 sections of UNIV 1020 or equivalent courses. As explained in Chapter X, the student learning outcome at this level will be assessed with the Information Literacy Test and a quiz embedded in the tutorial. Faculty teaching FYE courses will be urged to include the results of the quiz as part of each student's course grade, as is done with other quizzes that students currently take in these courses. The quiz is currently being developed and will be operational by Fall 2016.

The Chair of Tennessee Tech's General Education Committee will also make the availability of the foundational skill modules known to faculty teaching general education courses. Likewise, the Director of Tennessee Tech's first-year composition program will inform composition instructors of their availability. The

use of the modules in general education courses will broaden the impact of this part of our plan, and deepen the impact for those students who use the modules in multiple courses.

6.1.2 Tier 2: Developing Skills and Tier 3: Intensive

We have established the Tennessee Tech QEP Creative Inquiry Curriculum Grant Program to support the redesign of single-section courses or specific sections of multiple-section courses to include creative inquiry projects and assignments at the Tier 2 and Tier 3 levels. In general, two characteristics differentiate Tier 3 from Tier 2: (1) students in Tier 3 courses have greater autonomy in designing more of the components of the inquiry cycle (Fig. 4.1), and (2) Tier 3 course projects are longer term, often encompassing a full semester, thereby constituting a greater portion of a student's course grade. Consistent with Item 1, it is expected that Tier 3 creative inquiry projects will be of the open or authentic type rather than structured or guided. While the redesign of all sections of a given course with creative inquiry would be preferable to the redesign of a single section, it is recognized that this may not be feasible.

Our program draws from best practices at other universities, especially Florida Atlantic University and George Mason University. The program has also been informed by the recognized limitations of the original QEP course grant program administered for the past nine years at Tennessee Tech. Funding will be available for two types of grants: (a) single course grants for individual faculty or teams of faculty teaching a single course section, with a $5,000 limit and (b) curriculum course grants for faculty teams to make more holistic changes to multiple courses, with a $15,000 limit. The goal of each of these grants is to infuse creative inquiry into a course or set of courses. Grant applications will be reviewed by the Curriculum Grant Committee on a yearly basis.

We are piloting single course grants in the 2015-2016 academic year. The RFP for pilot year

grants included the following expectations of grant recipients:

1. Attend a CI course workshop ("Camp QEP") in May 2015 for support in developing a CI course.
2. Conduct the following activities for an annual report for two consecutive years, including the initial year of funding:
   a. Describe assessment activities for measuring the CI SLOs
   b. Score student performances on the assessment(s) administered in each grant course
   c. Examine results from CI SLO reports
   d. Summarize the goals of the original proposal and progress made in reaching them
   e. Describe course improvement efforts in response to the results
   f. Summarize outlays to date
3. Meet with QEP staff twice each semester for assessment purposes.
4. Participate in a spring focus group discussion.
5. Permanently incorporate CI components into the curricula as informed by assessment results.

Regarding Item 5 above, the RFP also noted that once a course was supplemented with a CI grant and redesigned to include CI activities, it was expected that those activities would remain part of the course in semesters following the grant period, with adjustments made as informed by assessment results. Department chairs were asked to complete an online form to agree to this condition. Grant applicants were also required to clarify the sustainability of their CI-infused course in the event that additional funds were not available in future years.

For the 2016-2017 year and beyond, faculty receiving grants will be encouraged to integrate the foundational skills modules in their courses. Faculty will also be encouraged to inform their students about the Creative Inquiry Summer Experience Grant Program (see below).

The SLOs for pilot year projects included

1. the ability to formulate an original intellectual or creative problem (SLO 2)
2. the ability to choose an appropriate discovery process to address the problem (SLO 3.1)
3. the ability to collect information relevant to the problem (SLO 3.2)
4. the ability to assess collected information in a discipline appropriate manner (SLO 3.3)
5. the ability to communicate their findings/creations/art/inventions in a discipline appropriate manner (SLO 5)

Faculty were asked to select SLO 4 and to choose three of the other four SLOs.

For the pilot year, we have approved 24 projects involving 27 faculty, 21 academic departments, and six schools or colleges. We have committed $105,000 to this effort, which will impact over 1,000 students in this year alone. Courses range from the 1000-level to the 4000-level, with about 50 percent at the 4000-level. Student enrollment in these courses ranges from as few as four students in a new senior-level computer science research class to as many as 75 students in a senior-level chemical engineering class. Three interdisciplinary projects have been funded, including a newly developed course, CHE 4973/NURS 4990, Clinical Immersion of Disciplinary Interfaces, which will be taught by faculty of the Department of Chemical Engineering and the School of Nursing. As shown in Chapter IX, we have budgeted $130,000 to the Creative Inquiry Curriculum Grant Program for AY 2016-2017, with increasing levels of funding each year. Altogether, Tennessee Tech is committing $850,000 in new funds to the Creative Inquiry Curriculum Grant Program. We will assess the results of this initial offering and make changes to improve this program in the future.

Faculty who attended the "Camp QEP" CI course grant workshop on May 20, 2015, learned to redesign their course using the backwards design process (Wiggins and McTighe, 2005).

The three phases of backwards design are

1. identifying desired student learning outcomes
2. determining acceptable evidence that students are making progress towards the learning outcomes
3. planning learning experiences and instruction

Faculty also learned how to assess the evidence from step 2 using the master CI rubric that was developed for the pilot year (Appendix 6).

The faculty who attended Camp QEP completed a survey to assess its efficacy and to improve it in the future. Responses to survey questions were scored on a 6-point Likert scale, with responses ranging from Strongly Disagree (1) to Strongly Agree (6). As shown in Table 6.1, faculty were very positive about the workshop and eager to learn more about innovative teaching and assessment practices. In written responses to additional questions, faculty showed considerable interest in participating in rubric norming sessions. These results will be shared with the incoming Director of the Center for Teaching and Learning so that future workshops can be arranged to meet these needs.

Table 6.2 shows the projected number of students affected by the curricular initiatives in support of Goal 1. Assumptions implicit in these figures include an average project grant of $5,000 and 40 students per CI-infused course per year.

6.1.3 Creative Inquiry Curriculum Sustainability Grant Program

As mentioned above, faculty are required to clarify the sustainability of their CI-infused course in the event that additional funds are not available in future years. As shown in Chapter IX, however, our plan does include a curriculum sustainability grant program so that CI courses that require consumable materials may continue after the initial year of funding. These grants are expected to be highly competitive. We have allocated $30,000 to this program in Year 1 of our

TABLE
6.1
May 2015 Camp QEP Survey Results.

Question	Mean Response
1. The workshop provided an effective overview of the QEP topic and focus.	5.5
2. The workshop provided an effective overview of the QEP student learning outcomes (SLOs).	5.3
3. The workshop provided an effective overview for the QEP Project Evaluation Rubric.	5.2
4. The workshop prepared me to develop a curriculum map of my course and the QEP SLOs.	5.0
5. The workshop prepared me to develop a student artifact to be scored with the QEP Project Evaluation Rubric.	4.9
6. The workshop prepared me to implement effective teaching practices to improve the performance of my students on the QEP SLOs.	4.5
7. The workshop prepared me to implement effective assessment practices to improve the performance of my students on the QEP SLOs.	4.7
8. Providing additional workshops and information about innovative teaching practices would be beneficial.	5.6
9. Providing additional workshops and information about innovative assessment practices would be beneficial.	5.5

QEP, with increasing amounts each year.

6.1.4 Creative Inquiry Funding for Honors Colloquia

In order to complete requirements for graduation *in cursu honorum*, Honors students must complete two Honors Colloquia. These classes are interdisciplinary three-credit courses uniquely designed by Tennessee Tech faculty and approved by the Honors Council. Two or three colloquia are normally offered each semester. Most of these courses are offered only once, although some may be re-offered several years after the original offering. Given the requirement that CI-infused courses retain their creative inquiry component in the semesters following the initial award, and due to the typical singular nature of Honors Colloquia, these classes are not eligible for CI course grants. In order to encourage faculty teaching these courses to incorporate creative inquiry in them, we have established funding for Honors Colloquia in EDGE, allocating $10,000 per year to this program. Faculty may apply for these funds via the Curriculum Grant Program described above by indicating that the class is planned to be an Honors colloquium. SLOs for these courses will be assessed the same as other Tier 2 or Tier 3 level courses, as described in Chapter X.

6.2 Projected Number of Students Affected by Goal 1 Initiatives.

Initiative	Pilot year 2015-2016	Year 1: 2016-2017	Year 2: 2017-2018	Year 3: 2018-2019	Year 4: 2019-2020	Year 5: 2020-2021
Tier 1 CI foundational skills initiative						
# students impacted*	40	280	2,100	2,200	2,300	2,400
Tier 2 and 3 curriculum grant program						
# new projects**	24	26	28	30	32	34
Total number of active projects by year	24	50	78	108	140	174
# of students impacted by active projects in current year (assumes 40 students per project per year)	1,013	2,000	3,120	4,320	5,600	6,960
Yearly subtotals						
# students impacted yearly*	1,053	2,280	5,220	6,520	7,900	9,360

assuming two sections of HON 1010 in Fall 2015, 14 sections of HON 1010 in Fall 2016, and all sections of UNIV 1020 or equivalent starting Fall 2017, with expected first-year student enrollment shown

**actual pilot year figures are used for AY 2015-2016 while figures in subsequent years assume $5,000 per grant*

6.2 EXPAND STUDENT CO-CURRICULAR OPPORTUNITIES FOR UNDERGRADUATE CREATIVE INQUIRY

In addition to the curricular initiatives described above, our QEP will provide co-curricular opportunities for students to more deeply engage in creative inquiry and to disseminate their work, as explained below.

6.2.1 Creative Inquiry Summer Experience (CISE) Grants

The Council on Undergraduate Research (CUR) has been a leading proponent of undergraduate research for over 30 years. CUR broadly defines undergraduate research as "an inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline." Undergraduate research as defined by CUR can, thus, be seen as what Levy et al. (2011) would classify as "authoring" or "producing," in that the product of undergraduate research adds new knowledge to the discipline. Undergraduate research has been identified by the American Association of Colleges and Universities (AAC&U) as one of 10 high-impact educational practices (Kuh, 2008). Reported benefits for students include improved retention, persistence to graduation and enrollment in graduate programs (Kuh, 2008; Pascarella and Terenzini, 2005; Lopatto, 2010); improved personal and cognitive skills including problem solving, critical thinking, and communication ability (Bauer and Bennett, 2003; Lopatto, 2006, 2007; Hunter et al., 2007); and clarification of career goals (Hunter et al., 2007).

For the past four years, Tennessee Tech's Undergraduate Research and Creative Activities (URECA!) program has provided summer grants to students to engage in research and creative work under the supervision of a faculty member. Approximately 32 grants in the amount of $3,000 were awarded for Summer 2015. We will expand and integrate this high-impact program as a Tier 3 learning experience in our QEP starting in the pilot year as the "Creative Inquiry Summer

Experience Grant Program." CISE participants will be expected to work 40 hours per week for 10 weeks on their projects. They will also be required to present their results on Research and Creative Inquiry Day (see below) and encouraged to present at local, regional, or national conferences.

Students will coordinate with faculty mentors to submit grant applications and participate in this program, as is current practice. Grant applications will be reviewed on a yearly basis by the CISE Program Committee, which will be led by the CISE Program Director, Dr. Ed Lisic. Dr. Lisic is also the Tennessee Tech URECA! Director. We have allocated $100,000 per year for these grants in the pilot year with increasing amounts allocated in the following years to allow for increased participation. Altogether, we have allocated $750,000 in new funds to this aspect of our program.

The CISE grant program will be complemented by our URECA! program, which will be budgeted by the Office of the Provost, starting at $100,000 for the pilot year. URECA! funds are complementary to our QEP budget and listed as such in Chapter IX. URECA! will provide grants to individual students or student teams to pursue research and creative activities during the academic year, as well as travel grants for students and their accompanying faculty mentors to present their work.

6.2.2 The Tennessee Tech Journal of Creative Inquiry

The Tennessee Tech Journal of Creative Inquiry (JCI) will be established as a venue for students to publish high-quality creative inquiry works in any field. The mission of the journal will be to educate students with the manuscript submission and peer review process, to encourage the dissemination of the products of creative inquiry, and to increase undergraduate involvement in creative inquiry. JCI will consider submissions of research and other creative products from undergraduate students in all academic areas. Submissions will be reviewed for publication by the JCI Committee. Dr. Ed Lisic, the CISE Program Director, will be the

JCI Editor-in-Chief. We will issue a call for JCI Committee membership in Spring 2016 and issue a call for papers in Fall 2016. The first issue of JCI is slated for production in Spring 2017. JCI will use the Open Journal publishing system. Marketing for JCI will be supported by the QEP Marketing Committee. By Year 5, JCI hopes to see a 25 percent increase in submissions.

6.2.3 Expanding Tennessee Tech Research Day to Tennessee Tech Research and Creative Inquiry Day

For the past 10 years, students have had the opportunity to display their research in a professional setting at Tennessee Tech's Research Day, which is hosted by the Office of Research. Students exhibit their work in the Roaden University Center in poster presentations judged by faculty. Awards are presented to students in undergraduate and graduate categories. Historically, this event has highlighted co-curricular research conducted by individual students. Beginning in Spring 2017, we will rename this event "The Tennessee Tech Research and Creative Inquiry Day" and expand its scope by

- encouraging the participation of students who have joined in CI-infused course projects as well as faculty-mentored research and creative explorations
- promoting more participation by students from the arts and humanities
- including creative performances by individuals or ensembles, oral presentations, and the display of creative and innovative works
- encouraging submittals from teams of students as well as individuals
- expanding the range of awards to reflect the increased scope of this event

Crowe (2007, p. 497) noted that "campus-wide celebrations encourage cross-disciplinary sharing and learning, opening students' and faculty members' eyes to the creative scholarship that occurs in other disciplines." We plan to increase participation in this event by 25 percent by Year 5.

6.3 SUPPORT AND ACKNOWLEDGE FACULTY AND STUDENTS WHO ENGAGE IN CREATIVE INQUIRY

The overarching goal of our QEP is to create a culture of undergraduate creative inquiry through increased involvement in and recognition of CI classroom and co-curricular activities. This section describes the support and recognition that will be provided to faculty and students to realize this goal.

6.3.1 Establish Excellence in Creative Inquiry Student Awards

Tennessee Tech currently recognizes and rewards students in various colleges for their achievements in undergraduate research. Beginning in Year 1, we will establish the first such University-wide award, the Excellence in Creative Inquiry Student Award. Two of these awards will be given annually to recognize outstanding participation in summer research or creative inquiry activities, including, but not limited to, participation in the Creative Inquiry Summer Experience program. Recipients will receive a monetary award of $500 and a plaque to commemorate their accomplishments.

6.3.2 Establish the Tennessee Tech Creative Inquiry Faculty Fellows Program

To ensure that a large part of the campus community is engaged in growing a culture of creative inquiry at Tennessee Tech and to provide the infrastructure required to implement and sustain EDGE, we are including a Faculty Fellows Program in our plan. Four Faculty Fellows will be selected annually based on their background and expertise via a competitive application process to serve as mentors to faculty who receive CI curriculum grants. Applicants will be required to have previously received a CI curriculum grant. In the spring of each year, new fellows will participate in a training institute sponsored by the Office of Creative Inquiry (described in Section 6.4.1) and the CTLE. The institute will consist of a workshop and additional activities, including

- revising the curriculum from a course for which they previously received a CI curriculum grant
- working with prior-year fellows to review selected reports from faculty receiving CI grants from the previous year
- reviewing CI-infused courses for the upcoming year
- participating in a CAT scoring workshop
- reviewing and calibrating the creative inquiry rubric with particular attention to the application of the rubric to courses in the upcoming year

Fellows will also assist the Director of the Office of Creative Inquiry in managing Camp QEP workshops for faculty who received CI curriculum grants for the upcoming year. Each fellow will be assigned to mentor four to five new grantees. Fellows will also meet with their mentees over the course of the year to support the progress of their courses. Fellows will receive a summer stipend as compensation for their duties.

For our 2015-2016 pilot year, Tech's Faculty Fellows include Ms. Bedelia Russell from the School of Nursing; Dr. Tom Timmerman from the College of Business; Ms. Shelley Brown from the College of Arts and Sciences; and Dr. Sandra Smith from the College of Education.

6.3.3 Offer Enhanced Institutional Membership to the Council on Undergraduate Research

As part of EDGE, Tennessee Tech will become an Enhanced Institutional Member of the Council on Undergraduate Research (CUR). This membership allows unlimited individual CUR membership for any Tech faculty member, student, or staff member at no additional cost. CUR members can access CUR's online resources, receive the CUR Quarterly journal, and receive discounted registration to CUR conferences and activities. Becoming an Enhanced Institutional Member exemplifies our commitment to growing a culture of creative inquiry at Tennessee Tech.

6.3.4 Provide Additional Opportunities and Support for Faculty Professional Development

The Office of Creative Inquiry will collaborate with the Center for Teaching and Learning Excellence to mentor CI curriculum grant recipients on effective pedagogical practices. Examples of the types of professional development activities that will be supported include

- workshops, seminars, and confidential one-on-one consultations on learning and teaching on topics such as curriculum design, assessment, promoting active learning, designing effective assignments, encouraging group discussion, and other methods to enhance creative inquiry
- faculty learning communities composed of faculty across disciplines and institutional units to promote creative inquiry
- campus visits by external consultants with expertise in creative inquiry
- travel support for faculty to attend workshops or conferences to improve their teaching and allow them to share their knowledge with colleagues at Tennessee Tech

6.3.5 Establish Excellence in Creative Inquiry Faculty Awards

Tennessee Tech currently recognizes excellence in innovative teaching and student mentorship with two awards. Since Spring 2008, the Award for Excellence in Innovative Instruction has been bestowed in recognition of exceptionally innovative projects that are carried out by Tennessee Tech faculty or staff as part of our 2006-2015 QEP. Beginning in Spring 2016, we will replace this award with the Award for Excellence in Creative Inquiry Instruction. Doing so will indicate the University's commitment to excellence in teaching creative inquiry. Up to three awards, in the amount of $1,000 each, will be given per year.

The Scholar-Mentor Award currently honors a faculty member who displays outstanding mentorship, integrating scholarship, research, and teaching excellence. We will continue to recognize faculty who meet the exceptional requirements for this award and, in addition, starting in Year 1, establish the Award for Excellence in Creative Inquiry Mentoring. This award will recognize the special efforts made by faculty as they mentor students undertaking summer research or creative inquiry activities, including, but not limited to, participation in the Creative Inquiry Summer Experience program. Doing so will indicate the University's commitment to excellence in creative inquiry. Up to two awards, in the amount of $1,000 each, will be given per year. Each of these new awards will be presented at the Tennessee Tech Faculty Awards Recognition Reception held in the spring.

6.4 DEVELOP THE INFRASTRUCTURE TO SUPPORT UNDERGRADUATE CREATIVE INQUIRY

For creative inquiry to flourish at Tennessee Tech, it is important for the various existing and newly proposed creative inquiry-related programs, offices, and initiatives to work in concert. The following actions will serve to realize this objective.

6.4.1 Establish the Office of Creative Inquiry

Tennessee Tech has created the Office of Creative Inquiry (OCI) to serve as the central hub for all QEP-related activities. OCI will be located in the Volpe Library and share resources and staff with the CTLE and the URECA! Office. The OCI staff will include two half-time directors: the Director of the Office of Creative Inquiry and the Director of the Creative Inquiry Summer Experience, who is also the Director of Tennessee Tech's URECA! program. A full-time administrative assistant will assist these offices and programs. OCI will also support a graduate assistant who will aid the Director of Assessment in QEP-related assessment activities. The OCI

Director and CISE Director will work closely with faculty, staff, students, and administration to build and maintain support of the campus community for EDGE. OCI will be ultimately responsible for all assessment activities, and collaborate with the Tennessee Tech Office of University Assessment in this endeavor. Annually, OCI will examine progress toward meeting performance criteria and identify and implement changes as required. Detailed responsibilities for the various parts of our plan are presented in Ch. VIII, Organizational Structure.

6.4.2 Establish a Central Website for Creative Inquiry

OCI programs and activities will be presented on an easy-to-navigate informational website. The webpage will communicate current and future opportunities for faculty, staff and student participation in creative inquiry, including those sponsored by OCI or partner programs such as CTLE and URECA! The website will showcase student and faculty creative inquiry projects and awards, faculty workshops, and grant deadlines. Informational details of EDGE, such as assessment activities, rubrics, and surveys will be provided. Links will also be provided to informational resources related to national, campus-wide, and college-sponsored research programs and fellowships; and celebration of student projects and achievements.

6.4.3 Establish EDGE Committees

Tennessee Tech has created the EDGE Steering Committee to provide directives for the implementation of EDGE. Membership of the EDGE Steering Committee is composed of faculty, staff, students, and administration. The Director of the Office of Creative Inquiry is the EDGE Steering Committee Chair. The Steering Committee meets monthly to review progress of the QEP. Committees that support the Steering Committee include the Curriculum Grant Committee, CISE Committee, Journal of Creative Inquiry Committee, Assessment Committee and Marketing Committee.

6.4.4 Collaborate with Undergraduate Creative Inquiry Partner Programs

In addition to the coordination efforts mentioned above, the Office of Creative Inquiry will collaborate with other Tennessee Tech offices and entities to enhance campus-wide participation in EDGE activities, including

- Tennessee Tech's First Year Experience Committee
- Tennessee Tech's General Education Committee
- Tennessee Tech's Faculty Development Steering Committee
- Volpe Library faculty and staff
- Retention Services
- Tennessee Tech's Technology Institute
- Tennessee Tech's Honors Program
- The Center for Teaching and Learning Excellence
- Writing Excellence Studio at Tennessee Tech (WEST)
- Tennessee Tech's Service Center

VII. TIMELINE

TABLE 7.1

An Overview of the Timeline for Implementation of the Various Components of EDGE.

Goal 1: Curricular Enrichment

Activities/Components	AY-1		AY0			AY1			AY2			AY3			AY4			AY5		
AYO = July 1 2015 - June 2016, etc.	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su
Goal 1: Curricular Enrichment																				
Information literacy modules developed		X																		
information literacy modules piloted			X																	
Tier 1 courses utilize information literacy modules						X			X			X			X			X		
CI-infused courses piloted			X	X																
Curriculum Grant Committee formed	X																			
Curriculum Grant Committee establishes guidelines for curriculum grant program and for curriculum sustainability grant program				X																
Curriculum Grant Committee calls for and reviews grant proposals				X			X			X			X			X			X	
Tier 2 and Tier 3 courses offered						X	X		X	X		X	X		X	X		X	X	
CI-infused Honors Program colloquia guidelines developed				X																
CI-infused Honors Program colloquia offered						X	X		X	X		X	X		X	X		X	X	

Goal 2: Expanded Co-Curricular Opportunities

Activities/Components	AY-1		AY0			AY1			AY2			AY3			AY4			AY5		
AYO = July 1 2015 - June 2016, etc.	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su
Goal 2: Expanded Co-Curricular Opportunities																				
CISE Committee formed				X																
CISE Committee establishes guidelines for CISE grant program				X																
CISE Committee calls for and reviews CISE grant proposals				X			X			X			X			X			X	
CISE projects undertaken					X			X			X			X			X			X
CISE Committee and Office of Research develop guidelines for Research and Creative Inquiry Day					X															
Research and Creative Inquiry Day							X			X			X			X			X	
Journal of Creative Inquiry (JCI) Committee formed				X																
Journal of Creative Inquiry Committee establishes procedures for JCI				X	X															
Call for JCI manuscripts							X			X			X			X			X	
Peer-review JCI manuscripts								X			X			X			X			X
Publish JCI									X			X			X			X		

TABLE
7.1

An Overview of the Timeline for Implementation of the Various Components of EDGE (continued).

Goal 3: Faculty and Student Support and Recognition Initiatives

Activities/Components	AY-1		AY0			AY1			AY2			AY3			AY4			AY5		
AYO = July 1 2015 - June 2016, etc.	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su
Goal 3: Faculty and Student Support and Recognition Initiatives																				
EDGE Steering Committee establishes criteria for Faculty Fellows program				X																
EDGE Steering Committee calls for and reviews Faculty Fellows applications				X			X			X			X			X			X	
Faculty Fellows program piloted		X	X	X																
Faculty Fellows mentor Curriculum grant recipients		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
EDGE Steering Committee establishes guidelines for providing professional development				X																
EDGE Steering Committee administers professional development program				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EDGE Steering Committee offers faculty travel funding opportunities						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Curriculum Grant Committee establishes criteria for Award for Excellence in Creative Inquiry Instruction						X														
Curriculum Grant Committee administers Award for Excellence in Creative Inquiry Instruction							X			X			X			X			X	
CISE Committee establishes criteria for Excellence in Creative Inquiry Student Awards						X														
CISE Committee administers Excellence in Creative Inquiry Student Awards							X			X			X			X			X	
CISE Committee establishes critieria for Award for Excellence in Creative Inquiry Mentoring						X														
CISE Committee administers Award for Excellence in Creative Inquiry Mentoring							X			X			X			X			X	
Camp QEP		X			X			X			X			X			X			X
Council of Undergraduate Research expanded institutional membership						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TABLE
7.1

An Overview of the Timeline for Implementation of the Various Components of EDGE (continued).

Goal 4: QEP Infrastructure

Activities/Components	AY-1		AY0			AY1			AY2			AY3			AY4			AY5		
AYO = July 1 2015 - June 2016, etc.	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su
Goal 4: QEP Infrastructure																				
Director of Office of Creative Inquiry hired			X																	
Director of Creative Inquiry Summer Experience hired			X																	
Administrative Assistant for Office of Creative Inquiry hired			X	X																
Establish OCI space			X	X																
Establish OCI website			X	X																
Information on OCI-related opportunities disseminated on website				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Develop marketing plan		X	X																	

QEP Development, Implementation and Assessment

Activities/Components	AY-1		AY0			AY1			AY2			AY3			AY4			AY5		
AYO = July 1 2015 - June 2016, etc.	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su	F	S	Su
QEP Development, Implementation and Assessment																				
EDGE Steering Committee formed				X																
EDGE Steering Committee provides directives for QEP implementation and implements plans				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Collaborate with OCI partner programs				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Assessment Committee formed				X																
Hire QEP Assessment assistant				X																
Establish assessment database				X																
Tier 1 information literacy assessment instruments selected			X																	
Tier 2 and Tier 3 course assessment strategies completed (CI rubric, etc.)				X	X															
Implement QEP assessment				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Marketing Committee formed				X																
Marketing Committee manages QEP marketing					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

VIII. ORGANIZATIONAL STRUCTURE

EDGE Organizational Structure.

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                    ┌─────────────────────────┐
                    │   Associate Provost     │
                    │   Office of the Provost │
                    └─────────────────────────┘
                                 │
┌──────────────────┐   ┌─────────────────────────┐
│      EDGE         │---│       Director          │
│ Steering Committee│   │ Office of Creative Inquiry│
└──────────────────┘   └─────────────────────────┘
          ┌──────────────────┼─────────────────────────┐
┌──────────────────┐ ┌──────────────────┐ ┌──────────────────────┐
│     Director     │ │       EDGE       │ │  Curriculum Grant,   │
│  Creative Inquiry│ │  Faculty Fellows │ │     Assessment       │
│ Summer Experience│ │                  │ │ and Marketing        │
│      (CISE)      │ │                  │ │    Committees        │
└──────────────────┘ └──────────────────┘ └──────────────────────┘
          │
┌──────────────────┐
│ CISE & JCI       │
│   Committees     │
└──────────────────┘
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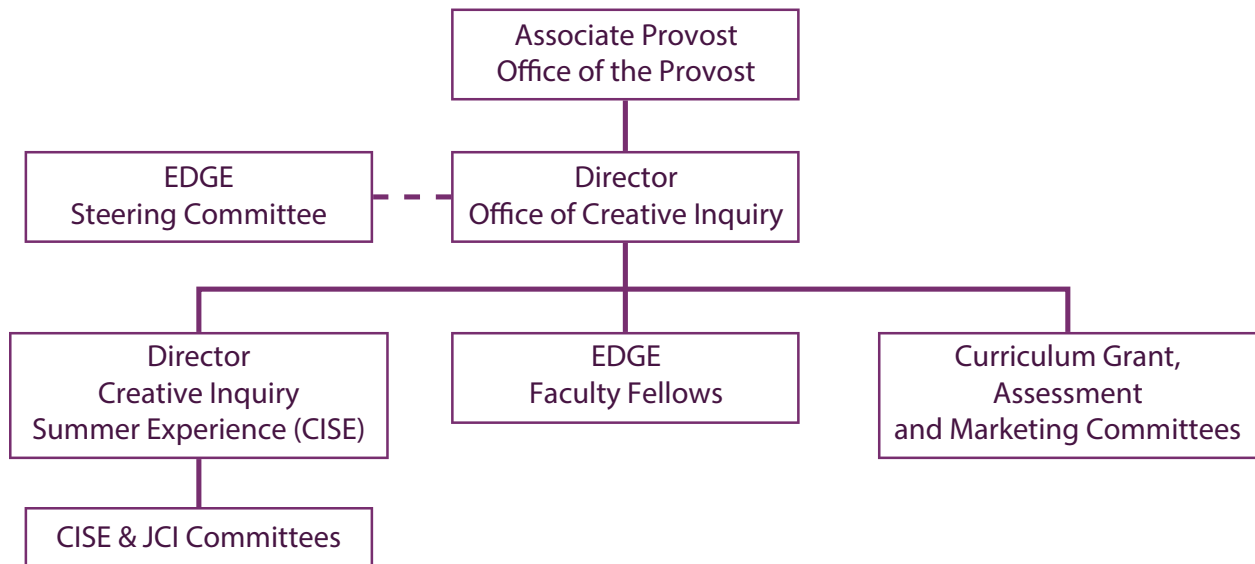
Tennessee Tech will establish the Office of Creative Inquiry (OCI) to support EDGE. As shown in the organizational chart above (Fig. 8.1), the Director of the OCI will report to the Office of the Provost, via the Associate Provost.

Three new positions are supported under the Office of Creative Inquiry. Dr. Lenly Weathers has been appointed as OCI Director. This position is a half-time (1/2 FTE) faculty assignment with additional stipend. The OCI Director will coordinate and oversee all aspects of EDGE to ensure its successful implementation. The OCI Director will lead the Faculty Fellows program and take the lead on the curriculum grant program and curriculum sustainability grant program. The Faculty Fellows will provide special assistance to the OCI Director with these two grant programs as described in Section 6.3.2 in order to ensure their success. The OCI Director will also collaborate with the Honors Program

Director on Honors colloquia project funding via the curriculum grant program; collaborate with the Tennessee Tech Assessment Director on assessment activities; manage the Excellence in Creative Inquiry Faculty Awards; and collaborate with the CTLE Director on Camp QEP and other EDGE professional development activities.

Dr. Edward Lisic has been appointed CISE Director. The CISE Director position is a half-time (1/2 FTE) faculty assignment with additional stipend. The CISE Director is responsible for administration of the CISE program, which includes management of the Excellence in Creative Inquiry Student Awards. The CISE Director will also serve as Editor-in-Chief of the Journal of Creative Inquiry and will collaborate with the Office of Research to host the Tennessee Tech Research and Creative Inquiry Day.

An administrative assistant will be hired to work half-time with the OCI and one-half time with the CTLE. The workload of the administrative assistant will be carefully managed and additional personnel resources provided if needed. The CTLE is a supporting partner in EDGE and will occupy adjoining rooms in the suite of offices with the Office of Creative Inquiry. This arrangement will facilitate ease of communication and collaboration for Camp QEP and other EDGE professional development initiatives.

The OCI will collaborate with the EDGE Steering Committee and other EDGE committees to assist in the implementation and sustainability of the plan. The **EDGE Steering Committee** will provide directives for the implementation of EDGE. One responsibility for this committee will be to establish guidelines for providing professional development to support the creative inquiry enriched curriculum, and approve the allocation of funds for this goal. Another responsibility will be to establish the criteria and guidelines for the Faculty Fellows Program, and to review applications. Membership of the Steering Committee is composed of faculty, staff, students, and administration. The OCI Director is the EDGE Steering Committee Chair. The Steering Committee meets monthly to review the progress of EDGE.

The **Curriculum Grant Committee** will establish the criteria and guidelines for the Curriculum Grant Program and review submitted proposals for funding. This committee will also be responsible for

- establishing the criteria and guidelines for the Curriculum Sustainability Grant Program, and reviewing submitted proposals for funding
- administering the Award for Excellence in Creative Inquiry Instruction, including establishing the criteria for selection

Membership of the Curriculum Grant Committee is composed of faculty, staff, students, and administration. The OCI Director is the Curriculum Grant Committee Chair. The Honors

Program Director is also a member of this committee.

The **CISE Committee** will establish and refine the criteria and guidelines for CISE grants and review submitted proposals for funding. The CISE Committee will also be responsible for

- administering the Excellence in Creative Inquiry Student Awards, including establishing the criteria for selection
- administering the Award for Excellence in Creative Inquiry Mentoring, including establishing the criteria for selection
- coordinating with the Office of Research in order to grow greater participation in Tennessee Tech's Research and Creative Inquiry Day

Membership of the CISE Committee is composed of faculty, staff, students, and administration, including the OCI Director. The CISE Committee is chaired by the CISE Director.

The **Journal of Creative Inquiry Committee** will establish the criteria and guidelines for the JCI, including layout and editing decisions, and will review manuscripts for publication. Membership of the JCI Committee is composed of faculty, staff, students, and administration. The CISE Director is the Chair of the JCI Committee.

The **Assessment Committee** will refine the assessment plan for EDGE. Curricular and co-curricular programs will be assessed using direct and indirect measures. The committee will also analyze assessment data, produce reports, and offer recommendations for modifications to the plan. The Assessment Committee will be chaired by the Tennessee Tech Assessment Director. Members will include the OCI Director, the graduate assistant in the Office of Assessment, students and faculty.

The **Marketing Committee** will collaborate with the Office of Creative Inquiry to promote and publicize opportunities for participation of faculty, staff, and students in all aspects of EDGE. This committee will include the OCI Director, and other faculty, staff, and students as needed.

IX. RESOURCES

EDGE is a major priority for Tennessee Tech. The University is committed to providing the financial, physical, and human resources necessary to implement EDGE and ensure its continued success beyond the QEP time frame. The QEP Committee carefully examined all aspects of the plan to determine the resources required for its successful implementation. Tennessee Tech is committing approximately $4.1 million in total resources, including pilot-year investments, over the six-year implementation of the QEP. This amount includes $3.0 million in new resources; $898,000 in complementary resources; and $240,000 of in-kind resources. As the project proceeds, the Office of Creative Inquiry will administer and carefully analyze all budget-related expenses.

Table 9.1 shows the breakdown of the budget according to the four goals of the plan, as well as expenses related to QEP development, implementation, and assessment. Over the course of EDGE, Tennessee Tech is committing $1.1 million in new funds to Goal 1: Curricular Enrichment, including $850,000 for the curriculum grant program; $200,000 for the curriculum sustainability grant program; and $50,000 for Honors program Creative Inquiry projects. With respect to Goal 2: Expanded Co-Curricular Opportunities, Tennessee Tech is committing a total of $794,500 in new funds, including $750,000 toward the CISE grant program. These monies are complemented by $850,000 of funding that will continue to be provided by the Office of the Provost to our URECA! grants program. URECA! funds may be used in part to support summer research grants as well, depending on the demand. With respect to Goal 3: Faculty and Student Support and Recognition Initiatives, Tennessee Tech is committing $355,000 in new funds, of which $216,000 is targeted toward faculty professional development. Tennessee Tech is committing $487,500 in new funds toward Goal 4: QEP Infrastructure, with the majority of these funds allocated to personnel including release time funding to the academic departments of the two Directors. Finally, over the course of the plan, Tennessee Tech is committing $242,300 in new funds, as well as $240,000 in in-kind funds, for QEP development, implementation, and assessment. These monies include $20,000 per year in new funds for an assistant who will be working in the Office of University Assessment, as well as $20,000 per year of in-kind funds for the CTLE Director.

TABLE
9.1

EDGE Budget.

Year 0 = July 1, 2015 - June 30, 2016; etc.

Goal 1: Curricular Enrichment		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
New Funds	Curriculum grant program	$100,000	$130,000	$140,000	$150,000	$160,000	$170,000	$850,000
	Curriculum sustainability grant program		$30,000	$35,000	$40,000	$45,000	$50,000	$200,000
	Honors program Creative Inquiry projects		$10,000	$10,000	$10,000	$10,000	$10,000	$50,000
Subtotal new		$100,000	$170,000	$185,000	$200,000	$215,000	$230,000	$1,100,000
Total		$100,000	$170,000	$185,000	$200,000	$215,000	$230,000	$1,100,000

Goal 2: Expanded Co-Curricular Opportunities		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
New Funds	Creative Inquiry Summer Experience (CISE) grant program	$100,000	$110,000	$120,000	$130,000	$140,000	$150,000	$750,000
	TTU Journal of Creative Inquiry editorial support		$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
	Expanded Research and Creative Inquiry Day		$2,500	$3,000	$4,000	$5,000	$5,000	$19,500
Subtotal new		$100,000	$117,500	$128,000	$139,000	$150,000	$160,000	$794,500
Complementary	URECA! Grants Program	$100,000	$150,000	$150,000	$150,000	$150,000	$150,000	$850,000
	Research Day (Research Office)	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$48,000
Subtotal Complementary		$108,000	$158,000	$158,000	$158,000	$158,000	$158,000	$898,000
Total		$208,000	$275,500	$286,000	$297,000	$308,000	$318,000	$1,692,500

Goal 3: Faculty and Student Support and Recognition Initiatives		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
New Funds	Faculty Fellows program	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$72,000
	Excellence in Creative Inquiry Instruction Awards		$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
	Excellence in Creative Inquiry Student Awards		$1,000	$1,000	$1,000	$1,000	$1,000	$5,000
	Professional development for creative inquiry enriched curriculum	$36,000	$36,000	$36,000	$36,000	$36,000	$36,000	$216,000
	Camp QEP	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$18,000
	Council on Undergraduate Research expanded Institutional membership		$3,000	$4,000	$4,000	$4,000	$4,000	$19,000
Subtotal new		$51,000	$60,000	$61,000	$61,000	$61,000	$61,000	$355,000
Total		$51,000	$60,000	$61,000	$61,000	$61,000	$61,000	$355,000

Goal 4: QEP Infrastructure

New Funds	OCI Director stipend	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$60,000
	CISE Director stipend	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
	OCI Director half-time teaching release	$11,000	$11,000	$11,000	$11,000	$11,000	$11,000	$66,000
	CISE Director half-time teaching release	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$51,000
	Administrative Assistant (half-time)	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$90,000
	Marketing	$10,000	$2,500	$2,500	$2,500	$2,500	$2,500	$22,500
	Operational support	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$120,000
	Travel allocation for Directors	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$48,000
Subtotal new		$87,500	$80,000	$80,000	$80,000	$80,000	$80,000	$487,500
Total		$87,500	$80,000	$80,000	$80,000	$80,000	$80,000	$487,500

TABLE
9.1
EDGE Budget (cont.).

Year 0 = July 1, 2015 - June 30, 2016; etc.

QEP Development, Implementation and Assessment		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
New Funds	External Evaluators	$5,000						$5,000
	Document editor	$2,500						$2,500
	Assessment assistant	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$120,000
	CAT testing	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$72,000
	Foundational skills assessment	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
	Expanded NSSE		$6,400			$6,400	$0	$12,800
Subtotal new		$44,500	$43,400	$37,000	$37,000	$43,400	$37,000	$242,300
In-kind	TTU Assessment Director	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$90,000
	Center for Teaching & Learning Excellence Director	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$120,000
	Reference & Information Services Librarian	$5,000	$5,000	$5,000	$5,000	$5,000	$15,000	$30,000
Subtotal In-kind		$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$240,000
Total		$84,500	$83,400	$77,000	$77,000	$83,400	$77,000	$482,300

Total	New	$383,000	$470,900	$491,000	$517,000	$549,400	$568,000	$2,979,300
Total	Complementary	$108,000	$158,000	$158,000	$158,000	$158,000	$158,000	$898,000
Total	In-kind	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$240,000
Total		$531,000	$668,900	$689,000	$715,000	$747,400	$766,000	$4,117,300

X. ASSESSING THE EFFECTIVENESS OF EDGE

Tennessee Tech planned for a comprehensive approach to the assessment of EDGE. This chapter includes a matrix mapping student learning outcomes, program outcomes, a prospective calendar of assessment for the next six years, assessment tools, a description of each tool, and a description of other institutional metrics. In addition, sample survey variables and expected results are included in the narrative. Tennessee Tech strives to assess its programs and make improvements based on results, and will approach the evaluation of EDGE in this fashion as well. Table 10.1 shows the relationship between each of the QEP activities and the SLOs and program outcomes. Table 10.2 shows the connections of SLOs to Assessment Tools. Table 10.3 shows the connections of program outcomes to assessment tools.

10.1 STUDENT LEARNING AND PROGRAM OUTCOMES

Student learning outcomes and program outcomes are proposed in Table 10.4 with an appropriate mix of direct and indirect assessments. Utilizing assessments already in place and incorporating QEP specific assessments are efficient ways for Tennessee Tech to evaluate the success of this student-learning initiative. Table 10.4 shows the proposed timeline and measureable objectives for the evaluation of EDGE.

10.2 REVIEW OF STUDENT WORK USING RUBRICS

The QEP Planning Committee developed a preliminary rubric to assess EDGE student learning outcomes (Appendix 6). This rubric was developed with language from the Association of American College and University's VALUE rubrics, George Mason University's Students as Scholars QEP rubric, and Florida Atlantic University's Distinction Though Discovery QEP rubric. Due to the anticipated involvement of many diverse programs and departments in EDGE, it was important that the rubric language transcend discipline and content areas. The rubric has been developed so that it may be adapted by faculty across many fields but will continue to assess the SLOs of interest. The rubric uses a four-category system of competence ranging from Novice, Emerging, Competent, to Advanced.

Faculty receiving Creative Inquiry curriculum grants and CISE grants will be required to assess student artifacts using the EDGE rubric and report those scores to the Director of Assessment. Samples of students' work will also be assessed by the Faculty Fellows to ensure consistent application of the rubric across the university and provide an independent judgment of student achievement.

10.3 OTHER DIRECT MEASURES OF STUDENT LEARNING

EDGE will also use a collection of performance measures that directly evaluate student learning within the tiered course model. These standardized performance measures will provide strong valid and reliable results in the assessment of the student learning outcomes. These measures will also allow for comparison to national norms data so that progress made at Tennessee Tech can be compared to other institutions across the country.

The Information Literacy Test (ILT) developed by James Madison University will be administered yearly to a random cluster sample of Tier-1 courses (UNIV-1020 sections). This measure focuses on the student's ability to determine the extent of information needed, where and how to access the information, and how to critically evaluate the information in multiple contexts. Administration in the pilot year of the QEP will be limited to two pilot Tier-1 courses that introduce information literacy modules.

TABLE 10.1 Matrix of SLOs and Program Outcomes.

QEP Goals	Activities	SLO 1: Students will effectively use digital information search tools.	SLO 2: Students will formulate a creative inquiry question or problem.	SLO 3.1: Choose an appropriate discovery process to address the problem.	SLO 3.2: Collect information relevant to the problem.	SLO 3.3: Assess collected information in a discipline-appropriate manner.	SLO 4.1: Applying critical thinking skills.	SLO 4.2: Applying creative thinking skills.	SLO 5: Students will communicate their findings/creations/art/inventions in a discipline-appropriate manner.	Undergraduate programs offer opportunities for creative inquiry.	Faculty support undergraduate students in creative inquiry activities.	Students participate in creative inquiry activities.	Students have opportunities to communicate/disseminate the results of their creative inquiry activities.	Students who have participated in creative inquiry activities are prepared for their career goals and advanced study.
1. Establish an undergraduate curriculum that encourages student success in creative inquiry	Interactive Web Tutorials (Tier 1: Foundational Skills)	■								■		■		
	Creative Inquiry Curriculum Grant Program (Tier 2: Developing Skills and Tier 3: Intensive)		■	■	■	■	■	■	■	■	■	■	■	■
	Creative Inquiry Curriculum Sustainability Grant Program		■	■	■	■	■	■	■	■	■	■	■	■
	Creative Inquiry Funding for Honors Colloquia		■	■	■	■	■	■	■	■	■	■	■	■
	Creative Inquiry Summer Experience (CISE) Grant Program		■	■	■	■	■	■	■	■	■	■	■	■
2. Expand student co-curricular opportunities for undergraduate creative inquiry	Tennessee Tech Journal of Creative Inquiry								■			■	■	■
	Expanding Tennessee Tech Research Day to Tennessee Tech Research and Creative Inquiry Day								■			■	■	■

Student Learning Outcomes — SLO 3: Students will explore a creative inquiry question or problem. SLO 4: Students will create an original scholarly or creative project.

Program Outcomes

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QEP Goals	Activities	SLO 1 — Students will effectively use digital information search tools.	SLO 2 — Students will formulate a creative inquiry question or problem.	SLO 3 — Students will explore a creative inquiry question or problem. 3.1 Choose an appropriate discovery process to address the problem.	3.2 Collect information relevant to the problem.	3.3 Assess collected information in a discipline-appropriate manner.	SLO 4 — Students will create an original scholarly or creative project. 4.1 Applying critical thinking skills.	4.2 Applying creative thinking skills.	SLO 5 — Students will communicate their findings/creations/art/inventions in a discipline-appropriate manner.	Program Outcomes: Undergraduate programs offer opportunities for creative inquiry.	Faculty support undergraduate students in creative inquiry activities.	Students participate in creative inquiry activities.	Students have opportunities to communicate/disseminate the results of their creative inquiry activities.	Students who have participated in creative inquiry activities are prepared for their career goals and advanced study.
5. Support and acknowledge faculty and students who engage in creative inquiry	Excellence in Creative Inquiry Student Awards								■				■	■
	Tennessee Tech Creative Inquiry Faculty Fellows Program									■	■			
	Enhanced Institutional Membership to the Council on Undergraduate Research								■	■	■	■	■	■
	Additional Opportunities and Support for Faculty Professional Development										■			
	Excellence in Creative Inquiry Faculty Awards										■			
4. Develop the infrastructure to support undergraduate creative inquiry	Establish the Office of Creative Inquiry									■	■	■	■	
	Establish a Central Website for Creative Inquiry									■	■	■	■	
	Establish EDGE Committees									■	■			
	Collaborate with Undergraduate Creative Inquiry Partner Programs									■	■			

TABLE 10.2 Assessment Strategies to Measure EDGE Student Learning Outcomes.

Assessment Strategies		Student Learning Outcomes							
		SLO 1	SLO 2	SLO 3 Students will explore a creative inquiry question or problem.			SLO 4 Students will create an original scholarly or creative project.		SLO 5
		Students will effectively use digital information search tools	Students will formulate a creative inquiry question or problem	3.1 Choose an appropriate discovery process to address the problem.	3.2 Collect information relevant to the problem.	3.3 Assess collected information in a discipline-appropriate manner.	4.1 Applying critical thinking skills.	4.2 Applying creative thinking skills.	Students will communicate their findings/creations/art/inventions in a discipline-appropriate manner.
Review of Student Artifact with Rubric	Tier 2: Developing Skills		D	D	D	D	D	D	D
	Tier 3: Intensive		D	D	D	D	D	D	D
Other Student Learning Measures	Tier 1: Foundational Skills (INFO LIT TEST)	D							
	Tier 2: Developing Skills (CAT Instrument)		D	D	D	D	D	D	D
	Tier 3: Intensive (CAT Instrument)		D	D	D	D	D	D	D
Creative Inquiry Course Survey	Tier 1: Foundational Skills	I							
	Tier 2: Developing Skills		I	I	I	I	I	I	
	Tier 3: Intensive		I	I	I	I	I	I	
Other Surveys	Faculty Survey	I	I	I	I	I	I	I	I

D = Direct Assessment
I = Indirect Assessment

10.3 Assessment Strategies to Measure EDGE Program Outcomes.

	Assessment Strategies	Program Outcomes				
		Undergraduate programs offer opportunities for creative inquiry.	*Faculty support undergraduate students in creative inquiry activities.*	*Students participate in creative inquiry activities.*	*Students have opportunities to communicate/disseminate the results of their creative inquiry activites.*	*Students who have participated in creative inquiry activities are prepared for their career goals and advanced study.*
Other Surveys	**Faculty Survey**					
	NSSE	I	I	I	I	
	FSSE	I	I	I	I	
	Department Survey	D	D		D	
	Career Survey					D/I
Metrics	**Journal of Creative Inquiry**				D	
	Faculty SLO & Pedagogy/ Worksheet Rubric		D			
	QEP and URECA! Records			D		

D = Direct Assessment
I = Indirect Assessment

10.4 Calendar of Assessment and Measurable Objectives 2015-2021. (Part 1)

Area	(Pilot) 2015-2016	Year 1 2016-2017	Year 2 2017-2018	Year 3 2018-2019	Year 4 2019-2020	Year 5 2020-2021
Critical thinking Assessment Test (CAT)	Pre- Post-test	Pre- Post-test	Pre- Post-test	Pre- Post-test	Pre- Post-test	Pre- Post-test
	Random 6 courses	Random 6 courses	Random 6 courses	Random 6 courses	Random 6 courses	Random 6 courses
Information Literacy Test	Implement Start of Fall Semester- Freshmen (baseline) & End of Spring Semester (Scores will match or exceed previous implementation)	Implement End of Spring Semester (Scores will match or exceed previous implementation)	Implement End of Spring Semester (Scores will match or exceed previous implementation)	Implement End of Spring Semester (Scores will match or exceed previous implementation)	Implement End of Spring Semester (Scores will match or exceed previous implementation)	Implement End of Spring Semester (Scores will match or exceed previous implementation)
EDGE Creative Inquiry Project Rubric	Implement Project Rubric Assessment	Implement Project Rubric Assessment	Implement Project Rubric Assessment	Implement Project Rubric Assessment	Implement Project Rubric Assessment	Implement Project Rubric Assessment
Faculty SLO's & Pedagogy Worksheet	Implement SLO 's and Pedagogy Assessment	Implement SLO 's and Pedagogy Assessment	Implement SLO 's and Pedagogy Assessment	Implement SLO 's and Pedagogy Assessment	Implement SLO 's and Pedagogy Assessment	Implement SLO 's and Pedagogy Assessment
Faculty Participant Survey	Program and Pedagogy Assessment	Program and Pedagogy Assessment	Program and Pedagogy Assessment	Program and Pedagogy Assessment	Program and Pedagogy Assessment	Program and Pedagogy Assessment
Student Participant Survey	Student Involvement Assessment	Student Involvement Assessment	Student Involvement Assessment	Student Involvement Assessment	Student Involvement Assessment	Student Involvement Assessment
Employer Survey	Scores on relevant items will match or exceed previous implementation	Scores on relevant items will match or exceed previous implementation	Scores on relevant items will match or exceed previous implementation	Scores on relevant items will match or exceed previous implementation	Scores on relevant items will match or exceed previous implementation	Scores on relevant items will match or exceed previous implementation
Journal of Creative Inquiry	Published each year; Show direct evidence of student projects	Published each year; Show direct evidence of student projects	Published each year; Show direct evidence of student projects	Published each year; Show direct evidence of student projects	Published each year; Show direct evidence of student projects	Published each year; Show direct evidence of student projects

10.4 Calendar of Assessment and Measurable Objectives 2015-2021. (Part 2)

Area	(Pilot) 2015-2016	Year 1 2016-2017	Year 2 2017-2018	Year 3 2018-2019	Year 4 2019-2020	Year 5 2020-2021
IDEA Teaching Evaluations	Will match or exceed 3-year average of faculty selection of items relevant to QEP	Will match or exceed 3-year average of faculty selection of items relevant to QEP	Will match or exceed 3-year average of faculty selection of items relevant to QEP	Will match or exceed 3-year average of faculty selection of items relevant to QEP	Will match or exceed 3-year average of faculty selection of items relevant to QEP	Will match or exceed 3-year average of faculty selection of items relevant to QEP
NSSE (National Survey of Student Engagement)	Administer in Spring 2016	Scores will match or exceed previous implementation; Administer in Spring 2017	Scores will match or exceed previous implementation	Administer in Spring 2019	Scores will match or exceed previous implementation; Administer in Spring 2020	Scores will match or exceed previous implementation
NSSE Module: Information Literacy	Administer in Spring 2016; Set Baseline	Administer in Spring 2017	Scores will match or exceed previous implementation	Administer in Spring 2019	Scores will match or exceed previous implementation; Administer in Spring 2020	Scores will match or exceed previous implementation
NSSE Module: Development of Transferable Skills	Administer in Spring 2016; Set Baseline	Administer in Spring 2017	Scores will match or exceed previous implementation	Administer in Spring 2019	Scores will match or exceed previous implementation; Administer in Spring 2020	Scores will match or exceed previous implementation
FSSE (Faculty Survey of Student Engagement)		Administer in Spring 2017; Set Baseline		Administer in Spring 2019	Scores will match or exceed previous implementation	
California Critical Thinking Skills Test (CCTST)	Scores will match or exceed the national average	Scores will match or exceed the national average	Scores will match or exceed the national average	Scores will match or exceed the national average	Scores will match or exceed the national average	Scores will match or exceed the national average

After the Tier-1 courses have shown to be effective, the information literacy modules will be incorporated into other UNIV-1020 sections. A total of six randomly selected UNIV-1020 sections will be tested yearly with the ILT after implementation of the information literacy modules.

The Critical thinking Assessment Test developed at Tennessee Tech University will be administered yearly to a random cluster sample of Tier-2 and Tier-3 courses. The CAT focuses on a set of skills associated with critical thinking that include: Evaluating Information, Problem Solving, Creative Thinking, and Communication. Faculty Fellows and faculty receiving Creative Inquiry grants will score the CAT in a yearly scoring session under the guidance of trained facilitators as another method of professional development. This test will be administered in a pre-/post-design to a random set of six courses in the QEP program for each academic year, three from Tier-2 and three from Tier-3, and will serve as a direct measure of the impact of participation in QEP projects. Baseline will be set by the average gain in the pre-/post-test scores during the pilot year.

The California Critical Thinking Skills Test (CCTST) serves as the University's general exit exam and tests all eligible graduating seniors annually on Reasoning Skills, Analysis, Inference, Evaluation, Deduction, and Induction. The CCTST is designed to permit test-takers to demonstrate the critical-thinking skills required to succeed in educational or workplace settings where solving problems and making decisions by forming reasoned judgments are important. It is expected that the focus on Creative Inquiry will result in higher exit exam scores. The measurable objective for the CCTST is that scores will match or exceed the scores of the previous administration of the exam.

The EDGE Rubric will serve as the assessment tool for faculty to evaluate the individual student EDGE course projects and CISE grantees. It was developed with diverse disciplines in mind and will collect direct evidence, as interpreted by faculty in the discipline, on the improvement of the goals and outcomes listed (see Section 10.2: Review of Student Work Using Rubrics). Results from rubric assessments of CI-infused courses will be compiled to evaluate the overall effectiveness of the QEP Instructor/Course.

10.4 INDIRECT MEASURES OF STUDENT LEARNING

A collection of surveys will be used as indirect measures of SLOs and Program Outcomes for EDGE. These surveys include: The EDGE Student and Faculty Surveys, the NSSE core survey and topical modules, the Faculty Survey of Student Engagement (FSSE) core survey and topical modules, Tennessee Tech Alumni Survey, Tennessee Tech Employer Survey, and the Camp QEP Curriculum and Pedagogy Worksheet (for description of each, see below).

The EDGE Student Survey will be developed to assess the opportunities provided to students in creative inquiry-infused courses. This survey will provide information about the types of creative inquiry activities that students were involved in and the perceived impact of those activities on the student's learning. The Assessment Committee will determine the variables that will be assessed.

The EDGE Faculty Survey will be developed as a companion survey to the EDGE Student survey. This will allow faculty to report the opportunities and activities that were provided to students in creative inquiry-infused courses. The Assessment Committee will determine the variables that will be assessed.

The National Survey of Student Engagement collects information annually at hundreds of four-year colleges and universities about student participation in activities and programs that promote their learning and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending their college or university. Institutions use their data to identify aspects of the undergraduate experience that can be improved through changes in policy and practice. Tennessee Tech has implemented this survey in 2007, 2009, 2011, and 2014, and

has longitudinal results to develop an efficient baseline for relevant variables pertaining to the QEP as proposed and listed as results in Chapter III. This survey is being implemented four times in the next five years as part of the Tennessee Higher Education Commission's (THEC) Quality Assurance assessment and QEP assessment.

The inclusion of two NSSE topical modules will allow the University to collect specific perceived gains in (1) the development of transferable skills and (2) information literacy. Although this collects indirect information concerning these two variables, they will be paired with the direct measures mentioned above. The development of transferrable skills has been implemented in 2014, and those results will serve as a baseline for future data collections. The goal is to match or exceed scores in the subsequent years after the pilot year of the QEP. For the information literacy NSSE module, baseline will be established at the beginning of the pilot year by testing all freshmen, and will serve as a second measure this year to assess gains in those students who have participated in one of our pilot projects.

The FSSE was designed to complement the NSSE, which is administered to undergraduate students, and also includes a topical module on the development of transferable skills. This instructional staff version (for faculty, instructors, and graduate students who teach) focuses on instructional staff perceptions of how often students engage in different activities; the importance instructional staff place on various areas of learning and development; the nature and frequency of instructional staff-student interactions; and how instructional staff organize their time, both in and out of the classroom. FSSE helps us better understand the role faculty members play in fostering student engagement through the teaching approaches they use. Taken together (NSSE and FSSE), the results from the two surveys demonstrate positive relationships between faculty emphasis on educationally purposeful activities and student engagement in those activities as well as between student engagement and such desired outcomes as critical thinking, grades, and deep learning (Kuh, Nelson Laird, and Umbach, 2004; Pike, 2006; Umbach and Wawrzynski, 2005).

The Tennessee Tech Employer Satisfaction

Survey is implemented at all Tennessee Tech career fairs, which is attended by numerous businesses that recruit our graduates from diverse areas of professions. The Tennessee Tech Employer Satisfaction Survey is deployed to employer contacts after every on-campus career fair to gauge employer satisfaction in a number of categories, including event facilities, Career Services staff, Tennessee Tech student preparedness regarding resumes and interviewing skills, and other categories. Survey responses enable Career Services to evaluate its career fairs, services, and programs based on external feedback and adjust its programming and resources accordingly in an ongoing effort to improve the services and programs it offers to students and employers. This survey will add to the perceived gains in communication.

The Camp QEP Curriculum and Pedagogy Worksheet is an artifact that will be used to measure the change in pedagogy for faculty teaching strategies while participating in Camp QEP. Camp QEP provides resources for faculty to incorporate creative inquiry in activities for learning in the classroom. The worksheet will be used to record changes in pedagogy and student learning, as an impact of the QEP projects and funding, and is a credible way to track work done in justification of the faculty incentive funding. It is expected that each faculty member awarded funding for development and project implementation will reasonably improve their pedagogy to enable creative inquiry learning.

10.5 OTHER INSTITUTIONAL METRICS

The Campus Labs "Planning Module" is a data collection system used by the Office of Assessment to collect data for Institutional Effectiveness Planning. These tools have also been incorporated to track the impact of the Creative Inquiry focus during and after projects are conducted. The system allows results to be reported and receives descriptions of the sustainment of projects. One goal of the program is to have faculty sustain the creative inquiry activities even after the original EDGE project is finished. To track this sustainment of creative inquiry, the reporting system has been adapted for unit leaders to continue to report progress in this area, and to allow for the administration to collect results accordingly.

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APPENDIX 1

Name	Rank/Title	Department/School	College
Weathers, Lenly	QEP Director/ Associate Professor	Civil and Environmental Engineering	Engineering
Barnes, Rita	Director	Honors Program	
Best, Michael	Professor	Agriculture	Agriculture and Human Ecology
Biernacki, Joe	Professor	Chemical Engineering	Engineering
Boles, Tammy	Assistant Professor	Environmental Studies	Interdisciplinary Studies
Brown, Shelley	Instructor	Sociology and Political Science	Arts and Sciences
Ennis, Theresa	Director	University Assessment	
Harris, Kevin	Associate Director	Center for Assessment and Improvement of Learning	
Irvin, Melissa	Director	Retention Services	
Lisic, Edward	Professor	Chemistry	Arts and Sciences
Manginelli, Ann	Associate Professor	Volpe Library	
Maxwell, Lori	Professor	Sociology and Political Science	Arts and Sciences
McDonald, Emily	Student	Curriculum and Instruction	Education
Moffett, Melissa	Student	Civil and Environmental Engineering	Engineering
Robinson, Stephen	Professor	Physics	Arts and Sciences
Rosemond, LaNise	Assistant Professor	Exercise Science and Physical Education and Wellness	Education
Russell, Bedelia	Associate Professor	Nursing	
Smith, Sandra	Associate Professor	Curriculum and Instruction	Education
Stinson, Claire	Vice President for Planning and Finance		
Timmerman, Thomas	Professor	Decision Sciences and Management	Business
Tribble, Daniel	Student	Civil and Environmental Engineering	Engineering
Winkle, Kimberly	Associate Professor	Art, Craft and Design	Education

APPENDIX 2 ORIGINAL QEP TOPICS FOR CONSIDERATION

The topics listed below are intended to be suggestive of the types of topics that might be considered. The list is not restrictive.

- Academic Advising
- Capstone experience
- Civic Engagement
  - Civic engagement is "working to make a difference in the civic life of our communities and developing the combination of knowledge, skills, values and motivation to make that difference. It means promoting the quality of life in a community, through both political and non-political processes." In addition, civic engagement encompasses actions wherein individuals participate in activities of personal and public concern that are both individually life enriching and socially beneficial to the community. (http://www.aacu.org/value/rubrics/civicengagement.cfm)
- Creative Thinking
  - Creative thinking is both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking. (http://www.aacu.org/value/rubrics/CreativeThinking.cfm)
- Critical Thinking
  - Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion. (http://www.aacu.org/value/rubrics/CriticalThinking.cfm)
- Diversity/Intercultural Knowledge and Competence
  - Intercultural Knowledge and Competence is "a set of cognitive, affective, and behavioral skills and characteristics that support effective and appropriate interaction in a variety of cultural contexts." (http://www.aacu.org/value/rubrics/InterculturalKnowledge.cfm)
- Engaged learning/high impact practices (undergraduate research, service-learning, study abroad, internships, volunteering, etc.)
- Ethical Reasoning
  - Ethical Reasoning is reasoning about right and wrong human conduct. It requires students to be able to assess their own ethical values and the social context of problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to ethical dilemmas and consider the ramifications of alternative actions. (http://www.aacu.org/value/rubrics/ethicalreasoning.cfm)
- Financial Literacy
- Freshman Year Experience (could also be sophomore, junior, etc.)
- Global Learning
  - Global learning is a critical analysis of and an engagement with complex, interdependent global systems and legacies (such as natural, physical, social, cultural, economic, and political) and their implications for people's lives and the Earth's sustainability. Through global learning, students should (1) become informed, open-minded, and responsible people who are attentive to diversity across the spectrum of differences; (2) seek to understand how their actions affect both local and global communities; and (3) address the world's most pressing and enduring issues collaboratively and equitably. (http://www.aacu.org/value/rubrics/globallearning.cfm)

- Healthy Living
- Information Literacy
  - o Information Literacy is the ability to identify what information is needed, understand how the information is organized, identify the best sources of information for a given need, locate those sources, evaluate the sources critically, and share that information. It is the knowledge of commonly used research techniques. (http://www.webpages.uidaho.edu/info_literacy/)
- Informed Decision-Making
- Inquiry and Analysis
  - o Inquiry is a systematic process of exploring issues, objects or works through the collection and analysis of evidence that results in informed conclusions or judgments. Analysis is the process of breaking complex topics or issues into parts to gain a better understanding of them. (http://www.aacu.org/value/rubrics/InquiryAnalysis.cfm)
- Integrated and Applied Learning (integrating formal instruction and co-curricular activities)
  - o Integrative and applied learning is an understanding and a disposition that a student builds across the curriculum and co-curriculum, from making simple connections among ideas and experiences to synthesizing and transferring learning to new, complex situations within and beyond the campus.
- Leadership
- Lifelong Learning Foundations and Skills
  - o Lifelong learning is "all purposeful learning activity, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence." The skills and dispositions involved in lifelong learning include curiosity, transfer, independence, initiative, and reflection. http://www.aacu.org/value/rubrics/LifelongLearning.cfm
- Oral Communication
- Problem Solving
  - o Problem solving is the process of designing, evaluating, and implementing a strategy to answer an open-ended question or achieve a desired goal. (http://www.aacu.org/value/rubrics/ProblemSolving.cfm)
- Quantitative Reasoning
  - o Quantitative Literacy (QL) – also known as Numeracy or Quantitative Reasoning (QR) – is a "habit of mind," competency, and comfort in working with numerical data. Individuals with strong QL skills possess the ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations. They understand and can create sophisticated arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc., as appropriate). http://www.aacu.org/value/rubrics/QuantitativeLiteracy.cfm
- Retention
- Teamwork
  - o Teamwork is behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on the team, and the quantity and quality of contributions they make to team discussions). (http://www.aacu.org/value/rubrics/Teamwork.cfm)
- Written Communication

APPENDIX 3 TIMELINE OF INTERACTIONS WITH TECH COMMUNITY

March 14, 2014	QEP Topic Selection Committee generates potential topics for QEP.
March 24, 2014	QEP Topic Selection Committee conducts poll to limit # of topics.
April 1, 2014	QEP Director and QEP Committee updated the TTU Leadership Team on the process of selecting the QEP; feedback was solicited.
April 15, 2014	QEP Director spoke with the TTU Student Government Association (SGA) leadership on the process of selecting the QEP; feedback was solicited.
April 21, 2014	QEP Director and QEP Committee spoke with the TTU Faculty Senate on the process of selecting the QEP; feedback was solicited.
April 23, 2014	QEP Director spoke with the TTU Dean's Council on the process of selecting the QEP; feedback was solicited.
Aug. 2, 2014	QEP Director discussed the online QEP topic survey at the Dean's Retreat; feedback was solicited.
Aug. 20, 2014	QEP Director spoke at the 2015 Fall Faculty Meeting on the process of selecting the QEP, noting the upcoming online survey of QEP topics and the upcoming solicitation for white papers.
Aug. 26, 2014	QEP Director spoke with the SGA leadership on the process of selecting the QEP; feedback was solicited.
Sept. 5, 2014	QEP Director and QEP Committee updated the TTU Faculty Senate on the process of selecting the QEP; feedback was solicited.
Sept. 9, 2014	QEP Director updated the SGA on the process of selecting the QEP; feedback was solicited.
Sept. 19, 2014	Electronic survey of faculty, staff, students, alumni and employers
Sept. 24, 2014	QEP Director updated the TTU Dean's Council on the process of selecting the QEP; feedback was solicited.
Sept. 25, 2014	Solicitation for white papers in Tech Times; solicitation repeated throughout next six weeks
Oct. 9, 2014	Townhall luncheon held to discuss the white paper submittal process; feedback was solicited.
Nov. 9, 2014	White papers due
Nov. 18, 2014, to Jan 20, 2015	QEP Topic Recommendation Subcommittee meetings
Jan. 21, 2015	QEP Director and URECA! Director meet with the Provost and Associate Provost to update them on the progress of selecting the QEP.
Jan. 22, 2015	QEP Topic Recommendation Subcommittee discussed proposed QEP program elements with the QEP Topic Selection committee
Jan. 26, 2015	QEP Topic Selection Committee members updated the TTU Leadership Team on the progress of selecting the QEP; feedback was solicited.
Jan. 28, 2015	QEP Topic Selection Committee members updated the TTU Dean's Council on the progress of selecting the QEP; feedback was solicited.
Feb. 2, 2015	QEP Director spoke with the TTU Faculty Senate on the progress of selecting the QEP; feedback was solicited.
Feb. 27, 2015	QEP Director updated the SGA President and Vice President on the process of selecting the QEP; feedback was solicited.
March 4, 2015	QEP Topic Selection Committee approves "Undergraduate Creative Inquiry" for TTU's QEP topic.
March 5, 2015	Associate Provost updated the TTU Dean's Council on the process of selecting the QEP; feedback was solicited.
March 25, 2015	Announcement of the QEP topic in Tech News

March 25, 2015	Faculty Fellow holds informational meeting to discuss QEP topic and pilot year application process with faculty; feedback is solicited.
March 31, 2015	QEP Director holds informational meeting to discuss QEP topic and pilot year application process with faculty; feedback is solicited.
April 2, 2015	Faculty Fellow holds informational meeting to discuss QEP topic and pilot year application process with faculty; feedback is solicited.
April 7, 2015	Faculty Fellow holds informational meeting to discuss QEP topic and pilot year application process with faculty; feedback is solicited.
April 10, 2015	QEP Director holds informational meeting to discuss QEP topic and pilot year application process with faculty; feedback is solicited.
April 17, 2015	Curricular grant proposals for 2015-2016 pilot year due.
May 20, 2015	QEP Director, Associate Provost and Faculty Fellows hold informational meeting to discuss QEP topic and pilot year curriculum grants; feedback is solicited; survey of attendees conducted.
May – September 2015	Teams draft and review sections of QEP document.
September – October 2015	QEP name contest.
Oct. 8, 2015	QEP draft released to campus; feedback is solicited.
Nov. 9, 2015	QEP Director spoke with the TTU Faculty Senate on the QEP; feedback was solicited.
December 2015	Final revisions to QEP report.

APPENDIX 4 QEP TOPIC ELECTRONIC SURVEY FOR FACULTY

Quality Enhancement Plan Topic Survey

TTU TENNESSEE TECH UNIVERSITY

Faculty Survey

We need your input! What should we do to improve student learning and development? As part of reaccreditation by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), Tennessee Tech will soon develop a new, five-year initiative to enhance the university experience of our students. The Quality Enhancement Plan Committee has identified the issues below as likely subjects for the initiative. In this survey, please rate the topics below with respect to their potential to promote a distinctive learning experience in the classroom and, possibly, through co-curricular activities. To help you decide, you might consider:

1) the impact that each topic could make to the success of our students after graduation,
2) the potential for growth of our students in each topic area, and
3) your potential involvement in each topic.

Considering the above factors, please indicate your level of support for each topic on a scale of 1 to 5, with 1 indicating low support for improvement and 5 indicating high support for improvement.

Important

In order to be of most help in identifying our topic(s), please only rate topics that you overall support to the highest degree for improvement as "high support for improvement", rate those that you most modestly support for improvement as "low support for improvement", and rate other topics in between. Diversity in your ratings will help us to zero in on the best topic(s) for the campus. Thank you for your participation!

Communication skills: improve student written and oral communication skills *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Civic awareness: enhance student knowledge of national/local events *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Creative thinking: foster student ability to bring together existing ideas into new configurations, develop new possibilities for something that already exists, or discover or imagine something new *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Critical thinking: foster student ability to assess claims, theories or hypotheses by accessing and evaluating relevant evidence, identifying biases and assumptions, and considering multiple perspectives *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Engaged/experiential learning: integrating formal instruction and co-curricular activities such as undergraduate research, service-learning, study abroad, and internships; as well as one-time on-campus or off-campus events *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Global awareness: enhance student knowledge of world events *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Intercultural competence: promote student appreciation for diversity *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Lifelong learning skills: prepare students for lifelong learning following graduation *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Problem solving: foster student ability to design, evaluate and implement a strategy to answer an open-ended question or achieve a desired goal *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Teamwork skills: foster the ability of students to collaborate effectively with others *

1 2 3 4 5

Low support for improvement ○ ○ ○ ○ ○ High support for improvement

Other Suggestions:

Which best describes you? *
○ Part-Time Faculty
○ Full-Time Faculty

Click the Submit button below when done.

Submit
Never submit passwords through Google Forms.

Responses of TTU seniors to the NSSE question:
"During the current school year, about how often have you done the following?"*

NSSE Question	2005	2006	2009	2011	2014
2d. Examined the strengths and weaknesses of your own views on a topic.	2.70	2.76	2.77	2.72	2.76
2e. Tried to better understand someone else's views by imagining how an issue looks from his or her perspective.	2.83	2.80	2.86	2.79	2.82
2f. Learned something that changed the way you understand an issue or concept.	2.71	2.80	2.84	2.84	2.77

Based on 4 point Likert scale: 1=Never, 2=Sometimes, 3=Often, 4=Very often

Responses of TTU seniors to the NSSE question: "How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?"*

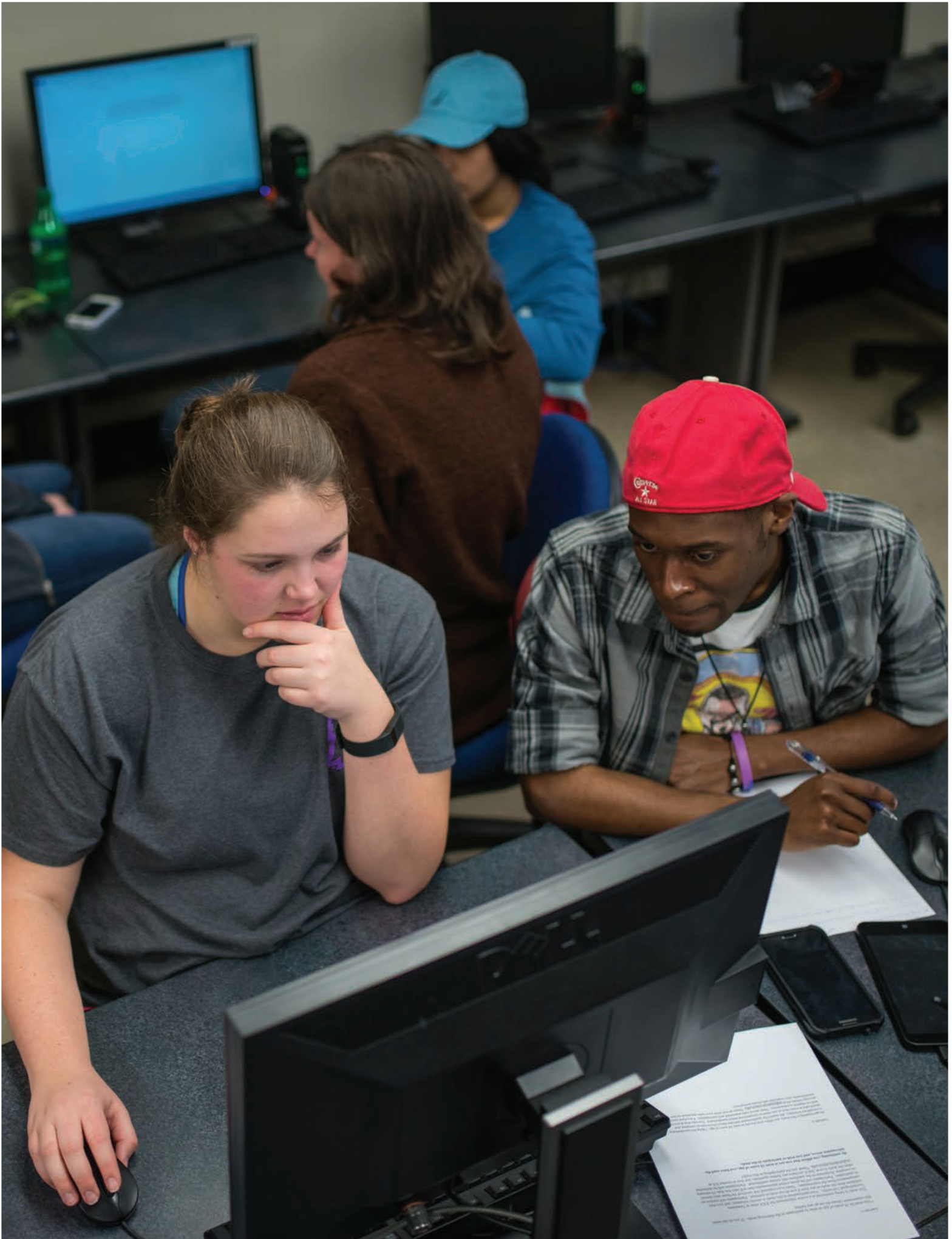| NSSE Question	2005	2006	2009	2011	2014
17a. Writing clearly and effectively.	2.91	2.92	3.01	2.93	2.83
17b. Speaking clearly and effectively.	3.02	2.90	3.00	2.97	2.92
17c. Thinking critically and analytically.	3.26	3.35	3.37	3.36	3.27

Based on 4 point Likert scale: 1=Very little, 2=Some, 3=Quite a bit, 4=Very much

APPENDIX 6

CREATIVE INQUIRY PILOT YEAR RUBRIC (ADOPTED FROM GEORGE MASON UNIVERSITY STUDENTS AS SCHOLARS MASTER RUBRIC)

QEP Student Learning Outcomes	Level of Competence			
	4 Advanced	3 Competent	2 Emerging	1 Novice
At the conclusion of your course, it is expected that your students will have demonstrated the following abilities:				
1. The ability to formulate a creative inquiry question or problem.	Articulate and refine a creative, focused, and manageable question that addresses potentially significant and previously less-explored aspects of the issue.	Articulate and refine a focused and manageable question that appropriately addresses key aspects of the issue.	Articulate a question that is too narrowly or too broadly focused to be addressed appropriately in a scholarly project.	Articulate a question that is far too narrow or too general to be addressed appropriately in scholarly project, or whose answer is already well-established.
2. The ability to choose an appropriate discovery process to address the problem.	Develop all elements of the methodology or theoretical framework; synthesize appropriate methodology or theoretical frameworks from across disciplines or from relevant sub- disciplines as necessary.	Develop critical elements of the methodology or theoretical framework in which some more subtle elements are ignored or unaccounted for.	Develop a methodology or theoretical framework in which some critical elements are missing, incorrectly developed, or unfocused.	Demonstrate a lack of understanding of the methodology or theoretical framework in the inquiry design.
3. The ability to collect information relevant to the problem.	Acquire information using effective, well-designed strategies and the most appropriate information sources; retrieve information about previous scholarship from credible sources that provide and enable comprehensive analysis and/or synthesis; effectively refine inquiry in response to evidence.	Acquire information using a variety of strategies and some credible information sources; retrieve information about previous scholarship from sources that provide and enable analysis and/or synthesis; demonstrate ability to refine inquiry in response to evidence.	Acquire information using simple strategies; retrieve information about previous scholarship from limited and narrow sources that may not provide or support analysis; demonstrate limited ability to refine inquiry in response to evidence.	Acquire information using rudimentary strategies; retrieve information that lacks relevance and quality; demonstrate no ability to refine inquiry.
4. The ability to assess collected information in a discipline-appropriate manner.	Demonstrate detailed attention to successful execution of a wide range of conventions; make appropriate, highly effective and perhaps innovative choices throughout the inquiry process.	Demonstrate consistent use of appropriate scholarly conventions; make appropriate and effective choices throughout the inquiry process.	Attempt to follow appropriate scholarly conventions; make some appropriate and effective choices throughout the inquiry process.	Provide little evidence of following appropriate scholarly conventions.
5. The ability to use conventions appropriate to the discipline when reporting or performing.	Consistently and successfully employ all key conventions appropriate to the audience and/or context; make appropriate, highly effective, and perhaps innovative choices in presenting or performing.	Successfully employ most conventions appropriate to the audience and/or context; make appropriate and effective choices in presenting or performing.	Employ some conventions appropriate to the audience and/or context; make some effective choices in presenting or performing.	Employ few or no appropriate scholarly conventions in presenting or performing.

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