

TH!NK Higher-order Skills
in Critical and Creative Thinking



TH!NK Annual Report | 2016

Submitted by Sue Carson, June 9, 2016

Student Learning Outcome Assessment Provided by Deb Moore

Faculty Development Assessment Provided by Katie McKee and Diane Chapman

Overview

The focus of the NC State Quality Enhancement Plan, TH!NK, is to improve students' higher-order thinking competencies, including critical evaluation, creative thinking, and reflection on their own thinking. The incorporation of an explicit common language of intellectual standards in courses across disciplines, combined with discipline-specific activities and feedback that emphasize the critical and creative thinking process throughout each TH!NK course will carry us toward this goal.

The TH!NK initiative addresses several of the **NC State strategic plan goals**. First and foremost, we aim to enhance the success of our students through the educational innovation and high-impact teaching strategies. The initiative enhances scholarship by investing in faculty through focused faculty development and the creation of a vibrant learning community. Because the TH!NK initiative is being implemented across disciplines, the learning community will bring faculty together, increasing the potential for interdisciplinary collaboration.

Impact Summary

Faculty and Student Engagement

- Academic years 2014/2015 and 2015/2016 focused on courses that primarily serve first year students.
- Beginning in the 2016/2017 academic year, we are focusing on vertical integration into multiple majors while expanding the first year foundation in academic year 2016/2017 and beyond.
- 76 TH!NK Faculty trained to date. *15 TH!NK Faculty 2014/2015 implementation, 27 faculty added 2015/2016, 34 faculty added 2016/2017 (trained May 2016).*
- 2499 students directly impacted in TH!NK sections (371 in 2014/2015; 2128 in 2015/2016)
- 95% of TH!NK Faculty reported participation impacting their other courses and sections
 - **Many** additional students indirectly impacted
- Implementation team facilitated numerous workshops in the OFD over the Fall and Spring semesters, impacting additional faculty and students outside of the QEP
 - Many additional students impacted

Student Learning Outcome Highlights

- Students are learning the intellectual standards in classes. A large majority of TH!NK students achieved 100% on the Intellectual Standards Quiz, exhibiting mastery of the definitions of the standards late October in the Fall 2015 term.
- Critical Thinking Assessment Test (CAT) Results
 - Fall 2015 CAT resulted in significantly more pre/post gains than in Fall 2014 (8 of 15 items & Total; 4 of 15 items but not Total, respectively). *Improved faculty development?*
 - All Enrollment Size categories (small to extra-large) showed significant pre/post gains. No significant difference between enrollment size of class.
 - STEM and Non-STEM courses each resulted in significant pre/post gains. No significant difference between STEM and non-STEM.
- TH!NK Critical and Creative Thinking Common Rubric
 - Met expectations on all 11 of 12 features; close on 12th
 - Average was ~ 2 on each feature which is defined by the rubric as Emerging among first-year students
 - More meaningful information is expected to be gained through vertical integration.
- Based on self-reported data, students are making gains in using intellectual standards in evaluating their thinking and making decisions. This is one indication of becoming more metacognitive.

Personnel

The core members of the implementation team are listed below (Table 1).

Name	Role in QEP	Faculty Appointment
Sue Carson, PhD	QEP Director	Assoc. Professor, Plant & Microbial Biology
Deb Moore	Asst. Director of Assessment	N/A
Yvette Thompson	Admin. Support Specialist	N/A
Anne Auten	Faculty Fellow	Lecturer, English
Anita Vila-Parrish, PhD	Faculty Fellow	Teaching Assistant Professor, Industrial & Systems Engineering
Sara Glee Queen	Faculty Fellow	Assistant Professor, Architecture
Diane Chapman, PhD	OFD Director, Assessment of Faculty Development	Teaching Associate Professor of Leadership Policy & Adult & Higher Education

Table 1: Implementation Team

Faculty and courses included in the Fall 2015 implementation are listed in Table 2, below. Table 2A displays faculty in their second year of TH!NK implementation; Table 2B displays faculty in their first year of implementation.

Last	First	Course #	Course Name
Auten	Anne	ENG 101	Academic Writing and Research
Bottomley	Laura	E 101	Intro to Engineering and Problem Solving
Brown	Deb	MIE 201	Intro to Business Processes
Cornett	Sheryl	ENG 101	Academic Writing and Research
Darling	Judith	ENG 101	Academic Writing and Research
Hall	Megan	ENG 100	Reading and Writing Rhetorically (formerly ENG 101) Introduction to Academic Writing)
Hayes	Holly	ENG 101	Academic Writing and Research
Lewald	Carol Ann	WGS 200	Intro to women and gender studies
Mainland	Catherine	ENG 220	Gt Works of Western Lit
Murray	D. Seth	IS 200	Intro to International studies
Nelson	Elizabeth	COM 110	Public Speaking
Parks	Lisa	LSC 101	Critical Thinking in Life Sciences
Patterson	Bob	STS 323	World population and food prospects
Severin	Laura	ENG 251	Major British Writers

Table 2a: TH!NK Faculty who were trained May 2014, in their second year of TH!NK.

Last	First	Course #	Course Name
Acker	Debbie	SLC 250	Critical and Creative Decision Making Models
Allen	Tania	D 100	Design Thinking
Ashwell	Chris	PO 295	Poultry and People: How the chicken conquered the world
Atkinson	Maxine	SOC 202	Principles of Sociology
Ballard	Tameshia	E 101	Intro to Engineering
Battestilli	Lina	CSC 113	Introduction to Computing - MATLAB

Clayton	Jacob	ENG 101	Academic Writing and Research
Crane-Seeber	Jesse	HSS 120	Intro to Humanities & Social Sciences
DeSoucey	Michaela	SOC 202	Introduction to Sociology
Ferzli	Miriam	BIO 181	Introductory Biology: Ecology, Evolution and Biodiversity
Ford	Ericka	TMS 211	Intro to Fiber Science
Fyfe	Paul	HON 296	Interpretive Machines
Gonzalez	Julia	ENG 332	Communication for Business and finance
Graves	Alex	USC 110D	Freshman Advancement Seminar
Kuo	Kenny	LSC 101	Critical and Creative Thinking in the Life Sciences
Lupton	Daniel	ENG 101	Academic Writing and Research
McGill	Alicia	HI 298	Special Topics in History
Nelson	Zak	ENG 101	Academic Writing and Research
Neyhart	Greg	CH 101	Chemistry - A Molecular Science
Petrovich	Lori	CH 101	Chemistry - A Molecular Science
Petters	Bob	MUS 180	Intro to Musical Experiences
Queen	Sara	D 104	First Year Studio I
Queen	Hailey	E 101	Intro to Engineering & Problem Solving
Rabah	Ghada	CH 454	Advanced Measurement Techniques II
Schmidt	Jessica Young	CSC 116	Intro to Computing - Java
Simon	Maggie	ENG 261	English Literature I
Mickle	James	BIO 181	Introductory Biology: Ecology, Evolution and Biodiversity

Table 2b: TH!NK Faculty who were trained May 2015, in their first year of TH!NK.

Table 3 shows TH!NK Faculty who participated in the TH!NK workshop May 9-13, 2016. They will begin TH!NK integration into their courses Fall 2016 or Spring 2017. Of note, we are moving toward a model of vertical integration of TH!NK within majors, and therefore no longer focus on only courses serving first-year students.

Last	First	Course #	Course Name
Gallardo-Williams	Maria	CH220	Introduction to organic chemistry
Paciulli	Lisa	BIO 181	Intro to Biology, ecology, evolution, biodiversity
Engell	Miles	BIO 181	Intro to Biology, ecology, evolution, biodiversity
Jacquet	Benoit	BIO 183	Intro to cellular & molecular biology
Joines	Jeff	TE 110	Computer based modeling in excel and VBA
Pasquinelli	Melissa	TE 303	Thermodynamics for textile engineers
Gorga	Russell	TE/TT 401 & 402	Senior design I & II
Bradford	Phillip	TE 105	Textile engineering: materials & systems
Krause	Wendy	TE 466	Polymeric Biomaterials Engineering
Gunter	Chris	HS 431	Vegetable production

Spafford	Anne	HS 242	Landscape horticulture
Shrek	Julieta	HS 401	Construction studio for landscape design
Hernandez	Ricardo	HS 495	Sustainable horticultural production
Rieder	Kathleen	ADN 418	Seminar in contemporary issues in Art & Design
Starly	Binil	ISE 216	Product development & rapid prototyping
Mayorga	Maria	ISE 361	Deterministic methods in OR
Vila-Parrish	Anita	ISE 443	Statistical Process Control
Brown	Jim	MB 451	Microbial Diversity
Taveirne	Mike	MB351	General Microbiology
Ramirez	Melissa	MB351	General Microbiology
Gardner	Marian Betty	GN 311	Principles of Genetics
Jeffrey	Penny	EMS 373	Instructional materials in science
Craig	Elizabeth	COM 457	Media and the family
Ingraham	Chris	COM/ENG 321	Survey of Rhetorical Theory
Winderman	Emily	COM/ENG 411	Intro to Rhetorical Criticism
Call	Laura	FLF 212	French Language, Culture and Technology
Isaacson	Nathaniel	FL 492	Senior Capstone
Allen	Jeff	FLF 309	French Phonetics and Pronunciation
Taylor	Eileen	ACC340	Accounting Information Systems
Showalter	D. Scott	ACC 450	Auditing and Assurance Services
Lewellen	Christina	ACC 330	Intro to Income Taxation
Pagach	Don	ACC 310	Intermediate Financial Accounting I
Cass	Cheryl	MSE 485	Biomaterials

Table 3: TH!NK Faculty trained May 2016.

Participation by College

Not surprisingly, the College of Humanities and Social Sciences was highly represented due to the focus on ENG 101 and FYI courses in “Phase 1” (academic years 2014/2015 and 2015/2016) of the QEP. As we move into “Phase 2” and focus on vertical integration into majors, as well as broadening the foundation in first-year courses, we are beginning to see broader participation of faculty and courses by college, as shown in Figures 1A-C. Pie charts count faculty only once – in their inaugural year. In the next year, we hope to expand participation into the College of Natural Resources and in the College of Education.

Fig 1A. Academic Years 2014/2015 - 2015/2016

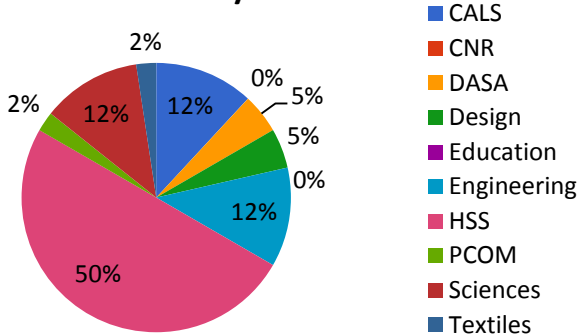


Fig 1B. Academic Year 2016/2017 (trained May 2016)

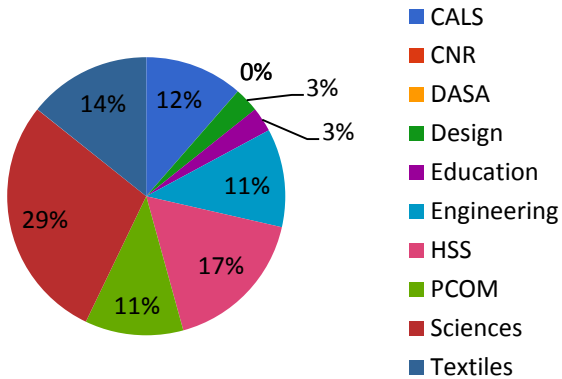


Fig 1C. All Years

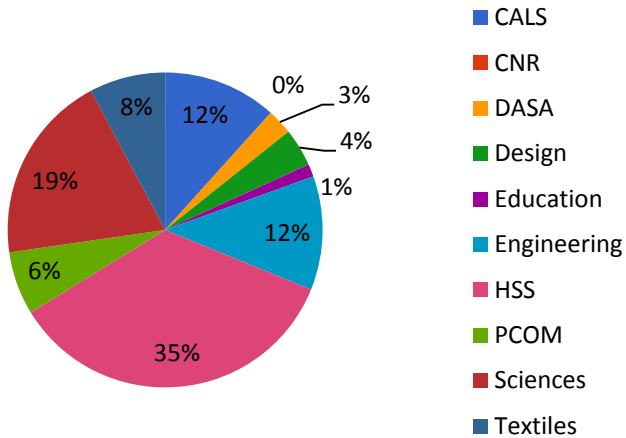


Figure 1A-C: Faculty participation by college.

TH!NK –related Scholarship

Publications

Vila-Parrish, A, T Baldwin, L Battestilli., H Queen, J Schmidt, and S. Carson. 2016. TH!NK: A Framework to Assess and Support Critical and Creative Thinking. *ASEE Proceedings*. *in press*.

Parks, L.D. A Journey to Develop a First-year Course in Critical Thinking. And the Learning Community it Created. *Advan. In Physiol. Edu.* <http://blog.lifescitrc.org/pecop/> 3.7.2016

Carson, S. 2015. Targeting critical thinking skills in a first-year undergraduate research course. *JMBE*. 16 (2): 148-156.

Funding

Parks, L. 2016. STEM Initiative Fund (HHMI) to develop new BIO 183 labs that incorporate more critical thinking and active learning. \$24,200.

National and international conference proceedings/published abstracts

Fyfe, P. Digital Pedagogy from Handwriting to Critical Making. SHORE Symposium (Supporting Humanities Online Research and Education), 2016. Purdue University, Lafayette, IN.

Vila-Parrish, AR. April 2016. Advancando y Evaluando el Pensamiento Creativo and Critico en la Aula. *Erasmus+ Visiting Scholar Program*. University de Pais Vasco-Gipuzkoa. San Sebastian, Spain.

Parks, LD and Lubischer, JL. 2016. The Formation of Student Learning Communities in a Life Science First-Year Course. FASEB. San Diego, CA.

Carson, S, S Queen, and D Chapman. Advancing and Assessing Creative Thinking in the Classroom. Oct 2015. 45th Annual Conference of the International Society for Exploring Teaching and Learning. Savannah, GA.

Chapman, D, S Carson, and J Stanigar. Capturing Knowledge Creation and Formative Evaluation of Faculty Development Activities: New Learning and TH!NK. Oct 2015. 45th Annual Conference of the International Society for Exploring Teaching and Learning. Savannah, GA.

Animation

Press, A, S Queen, A Vila-Parrish, S Carson. The Critical and Creative Process. <https://www.youtube.com/watch?v=b5QyOX1u7kA>

Faculty Development

Faculty members who implemented TH!NK in academic year 2015/2016 (mixture of those trained in May of 2104 and 2015) reported a substantial increase in the use of teaching strategies that focus on higher-order thinking. Table 4 shows self-reported use of a number of teaching strategies from a survey issued by the Office of Faculty Development shortly after the Fall 2015 semester. The faculty who were trained in the second year reported a higher level of confidence going in to the semester and had less trouble with using the common rubric. We believe this is because of changes we made to the faculty development workshop based on feedback during the pilot year.

Instructional Strategy	% Used Before TH!NK	% Used After TH!NK
Self-Reflection/Metacognition	25	93
SEE-I	4	68
Short Reflection	39	86
Concept Map	14	57
Exit Slips/Minute papers	11	39
Divergent Thinking	18	46
Critical Thinking Scenarios	43	68
Data Visualizations	36	57
Peer Review	50	68
Synthesis Matrix	4	21
Brainstorming	68	82
Evaluation/Critique of Primary Literature	36	46

Table 4. Faculty self-reported use of various teaching strategies before and after TH!NK training. N=28

The faculty development structure was similar in May 2016 as May 2015. Again, we held an intensive May workshop over 5 shorter days. We made modifications primarily in terms of the order of things we presented, aligning teaching strategies with specific student skill sets, and adjusted the language we used in talking about the student learning outcomes to help faculty align their thinking with the common rubric. A difficulty in the past had been having to translate back and forth between the language in assessment instruments and the language of the student learning outcomes written in the QEP. This was confusing for faculty. We simply streamlined this. However, there were no major substantive changes. The May 2016 faculty development workshop is provided in Appendix A.

Student Learning Outcomes Assessment

Outcomes measured by the Critical Thinking Assessment Test

Individual questions on the Critical Thinking Assessment Test (CAT) were mapped to the appropriate student learning outcomes defined in the QEP. Table 5 summarizes the statistically significant impact on student learning defined in the QEP as assessed by CAT. In summary, when mapped to our student learning outcomes, the CAT was able to detect statistically gains, from “baseline” to “Round 1” to “Round 2” with gains in the greatest number of outcomes in “Round 2” (Fall 2015 implementation).

CAT Pre-Post by Faculty Alignment of Student Learning Outcomes to CAT Questions

		Fall 2013 Baseline	Fall 2014 Round 1	Fall 2015 Round 2
TH!NK Faculty Alignment of SLOs to Critical Thinking Assessment Test (CAT)		Impact	Impact	Impact
SLO-A	Explains Intellectual Standards		Small	
SLO-B1	Uses Intellectual Standards		Small	Small
SLO-C1A	Raising Questions	Small		
SLO-C1B	Gathering/Assessing Relevant Information		Small	Small
SLO-C1C	Reaching Reasoned Conclusions	Small	Moderate	Small
SLO-C1D	Testing Conclusions Against Standards	Small	Moderate	Small
SLO-C1E	Considering Alternatives/Points of View			Small
SLO-C1F	Effectively Communicating			Small
SLO-C2A	Analyzing & Evaluating			Small
SLO-C2E	Elaborating			Small

Table 5. Student learning outcomes based on pre/post CAT profiles. Impact is an interpretation based on the effect size of the pre-post CAT score difference. Small impact is in the range of .1 to .3. Moderate impact is in the range .3 to .5. Large impact is identified with effect size differences greater than .5.

Effects of Class Size and Discipline measured by CAT in 2015

Repeated measures analysis of variance showed that there was no significant difference in gains due to course size (each of S, M, L, and XL course groupings showed significant gains), nor was there a statistically significant difference in gains made, as measured by CAT, for STEM versus non-STEM courses (both course groupings showed significant gains).

I anticipated greater gains in small enrollment courses, so it was surprising to see no measurable difference in critical thinking skill gains (as measured by CAT) due to enrollment size. I am cautiously optimistic, but feel there are a few things to consider in thinking about these data.

First and foremost, the CAT does not measure every type of learning gain that might happen in a course. For example, students in smaller classes are much more likely to receive critical feedback on writing and speaking, but those skills are not directly assessed in CAT. Another factor to consider is that informally, faculty in large classes reported having to invest more time in implementing activities and providing

feedback due to sheer number of students. For this reason, while it is clearly possible, implementation of evidence-based teaching strategies that enhance students' higher-order thinking may be less sustainable in courses with large enrollment over time. Finally, it is important to note that two out of three of the extra-large enrollment courses had either a laboratory or problem session associated, in which students had additional opportunities to engage in learning in a low-enrollment environment (albeit with a TA). This additional "touch" each week may have had an impact on student learning, so it is not the full story to classify these as "extra-large enrollment" courses.

CAT Comparison Between 2014 and 2015

In total, 10 ANCOVAs were conducted to test each of the following independent variables: All Students, Enrollment size_small, Enrollment size_medium, Enrollment size_large, Course Type_ENG 101, Course Type_FYI, Discipline,_STEM, Discipline_Non-STEM, Class Standing_Freshman, and Class Standing_Sophomores.

- There was a significant difference for All Students, $F(1,812) = 12.29$, $p = .001$. For the post-CAT score, the 2015 courses ($M=20.12$, $SD=5.11$) performed significantly better than the 2014 courses ($M=19.35$, $SD=5.87$).

Significant differences existed for two variables: Enrollment size_small and Discipline Non-Stem. In both cases, gains were significantly greater in 2015 compared to 2014.

Outcomes measured by the common rubric

The Common Rubric provides information on some outcome skills and behaviors that are not measured by the CAT. It is used to score an end-of-semester assignment. Without this measure, gaps in the TH!NK student learning outcomes assessment would exist, particularly in the realm of creative thinking.

Anticipating the need to provide an interpretation of the results of this assessment, a group consisting of the implementation team and some members of the QEP writing team set benchmarks (standards) for first-semester, first-year students for expected achievement at the end of their TH!NK course; we set the standard at a 2 (emerging) for all items except "articulating the issue and its scope" which was set at 3 (Developed). These expectations were set prior to implementation of the program in fall 2014. In Fall, 2015, students, on average, met or exceeded expectations in all of the skills and behaviors assessed by the common rubric except for *taking intellectual risks*.

Mean rubric scores were lower in 2015 compared to 2014. We are not sure what the difference means. While it may be a "real difference", it is important to note that we modified the rubric for clarification, enhanced the training on the rubric, and added two rubric norming sessions for faculty scoring in 2015. It is possible that these changes to faculty training may account for the difference (more stringent scoring).

Features 2014	Mean	Std. Dev.	Outcome	Features (Revised) 2015	Mean	Std. Dev.	Outcome
Does the student articulate the scope of the issue at hand?	2.7	0.9	Met	Articulating the issue and its scope	2.1	.8	Partially Met

Does the student evaluate evidence with respect to the issue at hand?	2.7	0.9	Above	Selecting & analyzing information	1.9	.7	Met
Does the student identify assumptions and the relevance of evidence to the issue context?	2.4	0.9	Met	Influence of context and assumptions	1.8	.8	Met
Does the student combine ideas in coherent and logical ways?	2.8	0.8	Above	Combining elements or ideas in ways that are coherent & logical	2.0	.7	Met
When appropriate, does the student address contradictory evidence or perspectives?	2.3	0.9	Met	Embracing contradictions	1.9	.9	Met
Does the student generate multiple potential ideas about the issue at hand?	2.5	0.9	Met	Generating & judging alternatives	2.1	.8	Met
Does the student demonstrate originality?	2.3	1.0	Met	Originality of thought	1.9	.8	Met
While completing the assignment, how does the student respond to new information?	2.4	0.9	Met	Adapability & flexibility of thought	2.0	.8	Met
How does the student make judgments about benefits and drawbacks of various ideas about the issue at hand?	2.5	0.9	Met	Judging appropriateness	1.9	.8	Met
Does the student take intellectual or creative risks in the generation and selection of approaches?	2.3	0.9	Met	Taking risks	1.7	.8	Met
Is the student able to elaborate on overarching ideas or principles (i.e. "the big idea") that support her/his response to the issue at hand?	2.4	0.9	Met	Abstract thinking or relating the "Big Idea"	2.0	.8	Met
How does the student explain ideas to others?	2.7	0.9	Above	Communication	2.2	.8	Met

Table 6. Skills and behaviors of critical and creative thinkers assessed by the common rubric in the Fall 2014 and 2015 implementations. N (2014) ~ 280; N (2015) ~ 215. Note, we deleted one item present in the 2014 version "Does the student predict consequences of an approach to the issue at hand?" because we felt it was redundant with "judging appropriateness".

Outcomes Measured by the Intellectual Standards Quiz

A large majority of TH!NK students achieved 100% on the Intellectual Standards Quiz (ISQ; N=1860, Mean=13, SD=0.2) and exhibited mastery of the definitions of the standards late in October during the Fall 2015 term.

Over the past two years, the TH!NK Director, Faculty Fellows, and overwhelming majority of TH!NK Faculty have expressed some discomfort with the Intellectual Standards Quiz. While it was necessary to measure students ability to “know” the intellectual standards, as described in the student learning outcomes in the submitted QEP, the outcome and assessment are at the lowest level of Bloom’s Taxonomy, running counter to the overall approach and goals of TH!NK. Because we have now shown that students are easily able to learn the definitions of the intellectual standards, we plan to use a different assessment that asks students to reflect on standards in the context of their course. We believe that this will be more valuable to faculty in understanding their students’ higher-order thinking. Both the Intellectual Standards Quiz and the new Intellectual Standards Reflection are included in Appendix B.

Student Reflections on TH!NK

At the end of the 2014 and 2015 Fall semesters, students received a web survey asking them to reflect on their thinking habits. The survey with the aggregated responses is displayed in Tables 7A and 7B. In summary, on average, students reported *moderate gains* in their metacognitive habits, but still have room to grow (Table 7A). Also promising are responses indicating TH!NK students are *sometimes* applying these thinking skills and behaviors in multiple settings, suggesting they are beginning to internalize them (Table 7B). Student self-reported perceptions in 2014 and 2015 were similar.

7a. Instructions to Items 1-7: Please reflect on your thinking behaviors both before the start of the semester and now. Tell us the degree to which you made gains in incorporating these behaviors over the course of the semester. **Scale:** 1=No Gain, 2=Little Gain, 3=Moderate Gain, 4=Great Gain.

Perceived Gains*	Fall 2014 (Round 1)			Fall 2015 (Round 2)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
1. Before I begin a project, I define for myself the purpose and scope of the work.	206	2.8	0.8	238	2.9	0.8
2. When I gather information, I evaluate it for accuracy, relevance and bias.	212	3.1	0.8	237	3.1	0.8
3. In interpreting data or evidence, I check that my conclusions are logical and follow from the evidence.	202	3.1	0.8	226	3.0	0.8
4. I ask myself whether I have considered all options when solving a problem or addressing an issue.	212	3.0	0.8	244	3.0	0.9
5. I take time to think through the implications and consequences of selecting one alternative over another.	202	3.0	0.8	228	2.9	0.9
6. In considering a problem or issue, I question my assumptions.	216	2.9	0.8	239	2.7	0.9
7. In considering a problem or issue, I study or consider points of view that conflict with my own.	209	3.0	0.8	238	2.8	0.9

7b. Instruction to Items 1-3: indicate the frequency with which you apply the behavior. **Scale:** 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Almost Always

Frequency of Use of TH!NK Skills/Behaviors**	Fall 2014 (Round 1)			Fall 2015 (Round 2)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
1. In preparing work for my TH!NK course(s), I use the relevant intellectual standards.	232	3.4	0.9	261	3.4	1.0
2. In preparing work for my other courses, I use the relevant intellectual standards.	232	3.1	1.0	261	3.0	1.0
3. In making decisions in my everyday life (e.g. major purchases, voting, deciding how to spend my time), I use the relevant intellectual standards.	232	3.1	1.1	261	2.9	1.1

Table 7a and 7b. Student self-reflection of metacognitive gains.

Student Reflection Quotes

In addition to the survey questions above, students were also asked the open-ended question “Please describe the single most important assignment, strategy, or other course aspect that made a meaningful difference to your higher-order thinking abilities.” Select student responses are quoted below.

- I was introduced to an entirely new way of thinking that explores every facet of a problem, some of which I never would have known existed previously. My TH!NK course has allowed me to see the world in a new way and I plan to apply this new way of thought to everything I encounter in my future even outside of the classroom.
- Taking the time to consider the counter arguments or various views on a certain topic and not just focusing on one.
- The most important aspect was after every argument we made, our teacher required us to back it with evidence, and then told us to argue the complete opposite, also with evidence to support the claim.
- I now question the credibility of the sources I am reading. Now, when I read graphs, I think about ways that the information can be biased or inaccurate.
- Allowing independence to students and giving them less structure and making them figure out more on their own. They will dislike it because there are fewer constraints, but will learn more because of it.
- The most important strategy my TH!NK course has offered me in my academic career is the ability to make a strong argument concisely using reliable evidence.
- The reflection assignments we complete at the end of Biology 181 labs have made the most meaningful difference. For instance we wrote a reflection on the importance on writing lab reports and how focusing of improving the skills used to write lab reports can improve writing/thinking in other classes as well.
- For my HON 296 class, I found that the critical thinking paper, where we evaluated a situation from multiple viewpoints and attempted to analyze relevant research to form an intelligent opinion was my most important assignment. This assignment, because it was based on a realistic scenario involving technology and schools, made me recognize how integral the TH!NK initiatives are in everyday life.
- The excise wherein I was required to analyse [*sic*] two pieces of propagandist media regarding hydraulic fracking was particularly stimulating and educational, since it required me to utilize both my intuition and research skills to contextualize and intellectually dissect each piece of media within the specific context of the facts and relevant social conditions.

Campus Outreach

In addition to numerous departmental meetings and meetings with Associate Dean groups, we have engaged additional faculty outside of the scope of the QEP in pedagogical workshops through the Office of Faculty Development. In this reporting year, we delivered five 90-minute workshops that were open to all faculty and instructional staff in the campus community. We also pioneered a Makerspace workshop for TH!NK Faculty at the DH Hill Library. Table 8 details workshops.

Date	Title	Registered	Attended
8/31/2015	Critical and Creative Thinking Process	20	17
9/29/2015	Using issue trees to think critically and creatively	14	10
10/14/2015	Writing to Think	8	8
1/20/2016	Aligning Group Discussion Formats with Course Goals and Outcomes	9	6
2/23/2016	Creating discipline-specific critical thinking scenarios	15	11
4/15/2016	Making in Your Classroom	22	10

Changes since the last Annual Report

Modifications we made to assessment of student learning outcomes

1. As mentioned in the previous annual review, we modified the common rubric for clarity for Fall 2015 and will continue to use that version in the 2016/2017 academic year. The current common rubric is attached in Appendix C.
2. We again updated assessment on the Intellectual Standards. Because students readily mastered the definitions of the standards, and because many stakeholders in the initiative felt uncomfortable incorporating a lower-order thinking assessment, we are moving toward a written reflection on relevant standards in the course, as described earlier in the report.

Modifications in faculty recruitment

The original plan submitted to SACS left open several options for faculty involvement in Phase 2 of the QEP. As described earlier in this report, we made the decision to pursue “vertical integration” into a number of majors.

Modifications to Funding

In the original plan, the Faculty Fellow model was only to persist for the first two years, and then faculty development was to move to the Office of Faculty Development. However, due to the success of the Faculty Fellow model, the Provost generously agreed to continue funding those positions, and so the model will remain intact.

Appendix A: Workshop Agenda May 2016

TH!NK Faculty Development Institute May 9 - 13 - Talley Student Center, Room 4280

Monday, May 9 (2:30-5 pm)

- 2:20 Arrive
- 2:30 Welcome and Introduction to TH!NK, faculty and student learning outcomes
- 3:20 Office of Faculty Development
- 3:30 Office of Assessment, Student Learning Outcomes overview
- 3:45 The Critical and Creative Process

Tuesday, May 10 (9 am – 3 pm)

- 8:40 Coffee
- 9:00 Introduction to the common rubric and explanation/reflection of work
- 11:15 Experiences and lessons learned from experienced TH!NK Faculty
 - Lori Petrovich, Lisa Parks, Elizabeth Nelson, Paul Fyfe
- 12:30 Networking Lunch (provided)
- 1:15 Self-reflection techniques
- 2:30 Introduction to Makerspace (Adam Rogers and Lauren Di Monte)

Wednesday, May 11 (9 am – 3 pm)

- 8:40 Coffee
- 9:00 RAISING QUESTIONS AND FORMULATING PROBLEMS
 - Concept mapping/Lotus Blossum, Three-finger summary, Issue tree
 - Divergent and Convergent Thinking Strategies
- 11:30 Lunch on your own
- 12:30 GATHERING AND ASSESSING RELEVANT INFORMATION
 - Introduction to the Intellectual Standards (SEE-I activity)
 - Using the intellectual standards to assess information and arguments

Thursday, May 12 (9 am – 3 pm)

- 8:40 Coffee
- 9:00 SYNTHESIZING AND GENERATING IDEAS, CONSIDERING ALTERNATIVES
 - Synthesis Matrix
 - Critical Thinking Scenarios
- 12:30 Lunch on your own
- 1:30 REACHING REASONED CONCLUSIONS/ EFFECTIVELY COMMUNICATING
 - Discussion techniques/strategies
 - Data Visualization

Friday, May 13 (9 am – 12 pm)

- 8:40 Coffee
- 9:00 Welcome – Mike Mullen, Vice Chancellor and Dean, DASA
- 9:15 Student learning outcome assessment/timeline
- 9:30 Deliverables for August
- 10:00 Cluster Breakout: Questions, Summer Support Network
- 11:45 Faculty Reflection/Evaluation

**Faculty reflections of new learning will occur preceding lunch and at the end of the day each day.*

Appendix B: Intellectual Standards Quiz and Intellectual Standards Reflection

TH!NK Intellectual Standards Quiz, Fall 2015

Select the Intellectual Standard that best fits the definition provided?

- Quality of being expressed, remembered, understood in an unambiguous way, through elaboration or examples
 A. Clarity
 B. Logic
 C. Relevance
 D. Significance
- Adding something new to existing models, thoughts, approaches, or knowledge bases within a discipline
 A. Breadth
 B. Contribution to the domain
 C. Relevance
 D. Significance
- How well an idea fits within a context or constraints
 A. Appropriateness
 B. Fairness
 C. Originality
 D. Precision
- Expressing details, information, or evidence that has a connection or relation to the matter at hand
 A. Appropriateness
 B. Breadth
 C. Fairness
 D. Relevance
- Quality of being correct, free from error, and factually true
 A. Accuracy
 B. Clarity
 C. Fairness
 D. Precision
- Quality of being definite, exact, and detailed about something
 A. Accuracy
 B. Appropriateness
 C. Precision
 D. Significance
- Expresses details and complexities of something
 A. Appropriateness
 B. Depth
 C. Logic
 D. Significance
- Able to change or be changed in order to fit or work better in some situation or for some purpose
 A. Accuracy
 B. Adaptability/Flexibility
 C. Breadth
 D. Clarity
- A wide scope or range of something; comprehensive perspective on a topic, question, issue
 A. Accuracy
 B. Breadth
 C. Originality
 D. Precision
- A proper or reasonable way of thinking about or understanding something; connecting claims with meaningful and credible evidence
 A. Breadth
 B. Depth
 C. Logic
 D. Relevance
- Free from self-interest, prejudice, or favoritism; marked by impartiality and honesty
 A. Accuracy
 B. Adaptability/Flexibility
 C. Relevance
 D. Fairness
- Being new and different in a good and appealing way
 A. Originality
 B. Precision
 C. Relevance
 D. Significance
- Quality of being important; the quality of having notable worth or influence
 A. Originality
 B. Precision
 C. Relevance
 D. Significance

TH!NK Intellectual Standards Reflection, Fall 2016 Proposed)

Consider the Intellectual Standards for Critical and Creative Thinking.

Clarity	being easy to understand and free from confusion or ambiguity
Accuracy	being free from errors, mistakes, or distortions
Precision	being specific, definite and exact
Relevance	bearing upon or relating to the matter at hand
Depth	dealing with the complexities of the issue
Breadth	recognizing insights in more than one side of a question
Logic	reasoning correctly with the system of principles, concepts, and assumptions that underlie a discipline, activity or practice
Significance	having relative importance
Fairness	treating all sides alike without reference to one's own feelings or interests
Originality	constructive imagination and independent thought
Adaptability	the ability to adjust thinking under new or unstable conditions and to move among various vehicles of thought depending on context
Appropriateness	goodness of fit between the constraints of the problem and the properties of the solution
Contribution to the Domain	the accepted worth of new ideas within the discipline

Select any two of the standards that you feel are fundamental in this course. For each, provide an example of where the standard came into play in one of your assignments/activities in the course. How will each standard be important in your career?



Appendix C: Common Rubric for Critical and Creative Thinking