



Assessing Critical Thinking

What to measure and how to fairly measure it

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University
of Houston
Clear Lake

Session Overview

1. Background on our QEP regarding Applied Critical Thinking at the University of Houston Clear Lake (6 minutes)
2. Assessment (planned versus actual) at UHCL (12 minutes)
3. Examination of recent NSSE data (12 minutes)
4. Discussion on measurement and assessment of critical thinking (30 minutes)
 - a. This final section is an interactive session of reflective discussion

We have budgeted time within each section for (some) questions and discussion. If you have a question or observation, please participate!



The QEP at UHCL

What is a QEP?

- Mandated by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).
- The QEP is a 10-year, academically focused commitment
 - Requires approval by SACS
 - Must include an implementation plan with budget
 - Requires a 5-year progress report
 - Final 5-years must focus on institutionalizing (making permanent) the changes brought on by the QEP
- Our timeline
 - Information gathering and selection committees (2009 to 2010)
 - Staffing and organizing (2010)
 - QEP Approval via SACS (2011 to 2012)
 - Implementation (2012 and ongoing)

Applied Critical Thinking for Lifelong Learning and Adaptability

Faculty Objectives

1. Incorporate best practices advocated by the Foundation for Critical Thinking for teaching ACT skills into one or more of their courses.
2. Incorporate ACT learning outcomes into one or more of their courses.
3. Identify best practices and learning outcomes on the course syllabi of the ACT courses they are teaching.

Student Objectives

1. Students will use **curiosity** to identify a particular problem or area of interest within the discipline.
2. Students will make **connections** to their particular issues or problems based upon evidence acquired by research methodologies and citation methods within their discipline
3. Students will demonstrate through **creativity** a divergent mental approach exploring original alternative views and solutions.
4. Students will **communicate** outcomes through writing and or presentations.

The QLT

QEP Leadership Team (QLT)

QLT Responsibilities

- Implementation, evaluation, and revision of QEP
- Liaisons to respective schools
- Endorse ACT courses
- Promote and discuss ACT
- Plan, design, and implement ACT workshops
- Oversight for ACT website
- Other duties as needed

Co-Chairs:

Dr. Pat Cuchens - Director OIE

Dr. Larry Kajs - Professor SOE

Faculty Leads:

BUS - Dr. Leroy Robinson and Dr. Troy Voelker

HSH - Dr. Shreerekha Subramanian and Dr. Amy Lucas

SCE - Dr. Kwok-Bun Yue and Dr. Soma Datta

SOE - Dr. Larry Kajs and Dr. Randy SeEVERS

Other Members:

Interim Associate Vice President for
Academic Affairs - Dr. Kathryn Matthew

Faculty Senate - Dr. Sandra Browning

Adjunct Faculty - Christine Callahan

Library - Susan Steel

PASA - Dr. Angela Kelling

SSA - Annette Mendoza

Student - Daniela Vasquez Klisans

Applied Critical Thinking (ACT) Courses

Purpose

1. Increase student engagement
2. Make critical thinking explicit
3. Facilitate the emergence and development of critical thinking
4. Increase transferability of critical thinking skills
5. Assess artifacts of student critical thinking

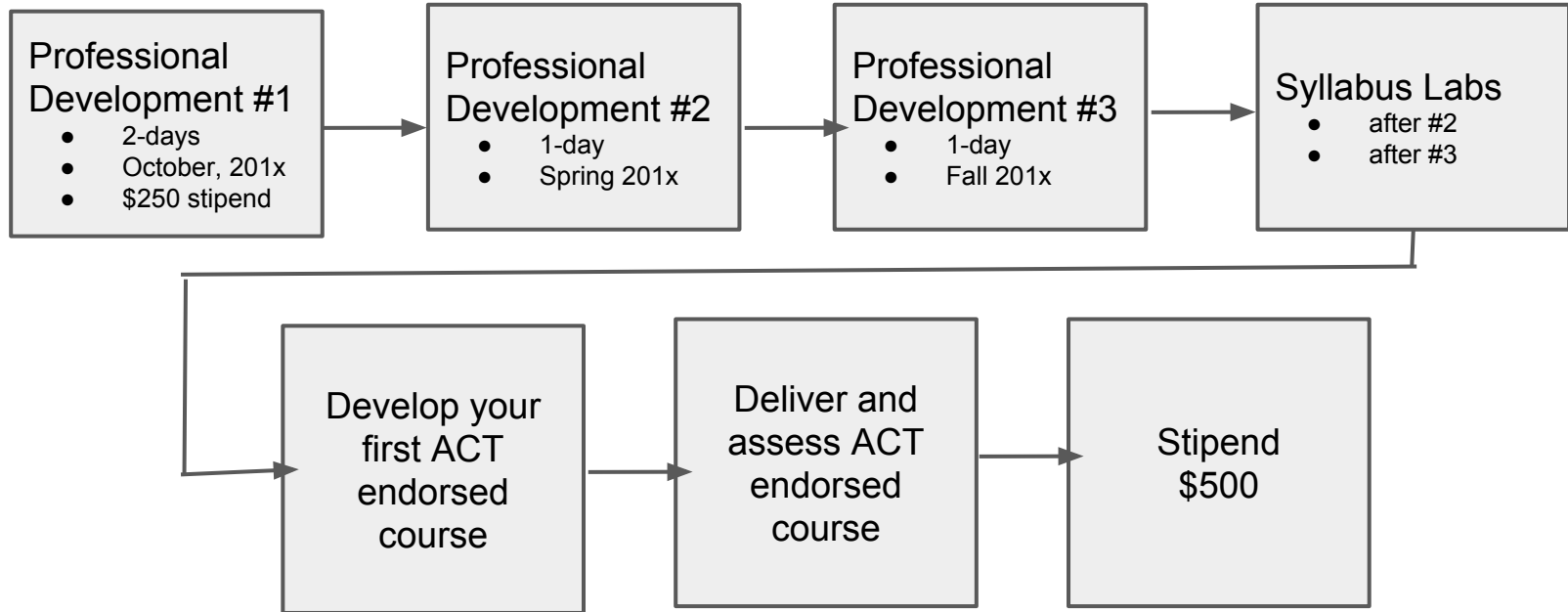
www.uhcl.edu/qep

You can view the [endorsed syllabus](#) (and syllabus from pre-endorsement) for all ACT courses at the UHCL QEP website.

Syllabus Endorsement

1. A standardized ACT statement
2. A description of how critical thinking manifests within the course and within the associated profession.
3. At least three student learning outcomes, each grounded in a unique element of thought (ACT-SLO)
4. Course assignments and activities that are clearly linked to at least one ACT-SLO
5. An assessment plan which enables a three-level assessment of each student's individual performance relative to each of the three ACT-SLO

The Faculty Development Roadmap



Current accomplishments

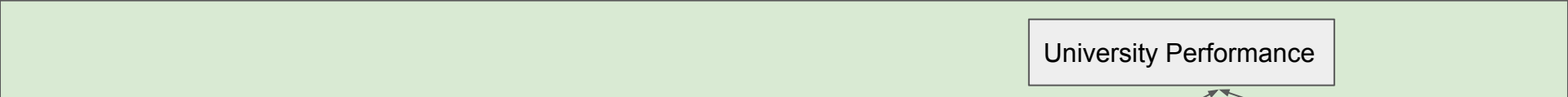
- Five faculty cohorts
- Administrative leadership session
- Three staff sessions
- Adjunct/Doctoral session
- General Education session

Item	Total	BUS	HSH	SCE	SOE
Faculty Professional Development*	168	28	45	54	35
Staff and Administrator Professional Development	169				
Faculty with ACT endorsed courses	51	8	12	21	10
ACT endorsed sections delivered	208	46	27	83	52
Students taking at least one ACT endorsed course	4,225	1,494	509	1,387	835
Students taking the first-year seminar	127				

Institutionalizing our QEP (moving forwards)

1. Shifting the QEP into our new Faculty Development Center
2. Downsizing the QLT
 - a. One faculty per college (fewer or no staff involvement)
3. Changing the structure of the faculty development roadmap
 - a. Working lunch model (12 sessions, one per month, at 2.0 hours each?)
4. Maintaining the Endorsement and Assessment processes
 - a. Emerging scholarship (lots of data)
5. Starting to think about QEP 2.0

Assessing ACT at UHCL



University Performance

College Performance



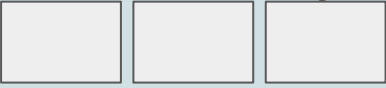
Program Performance



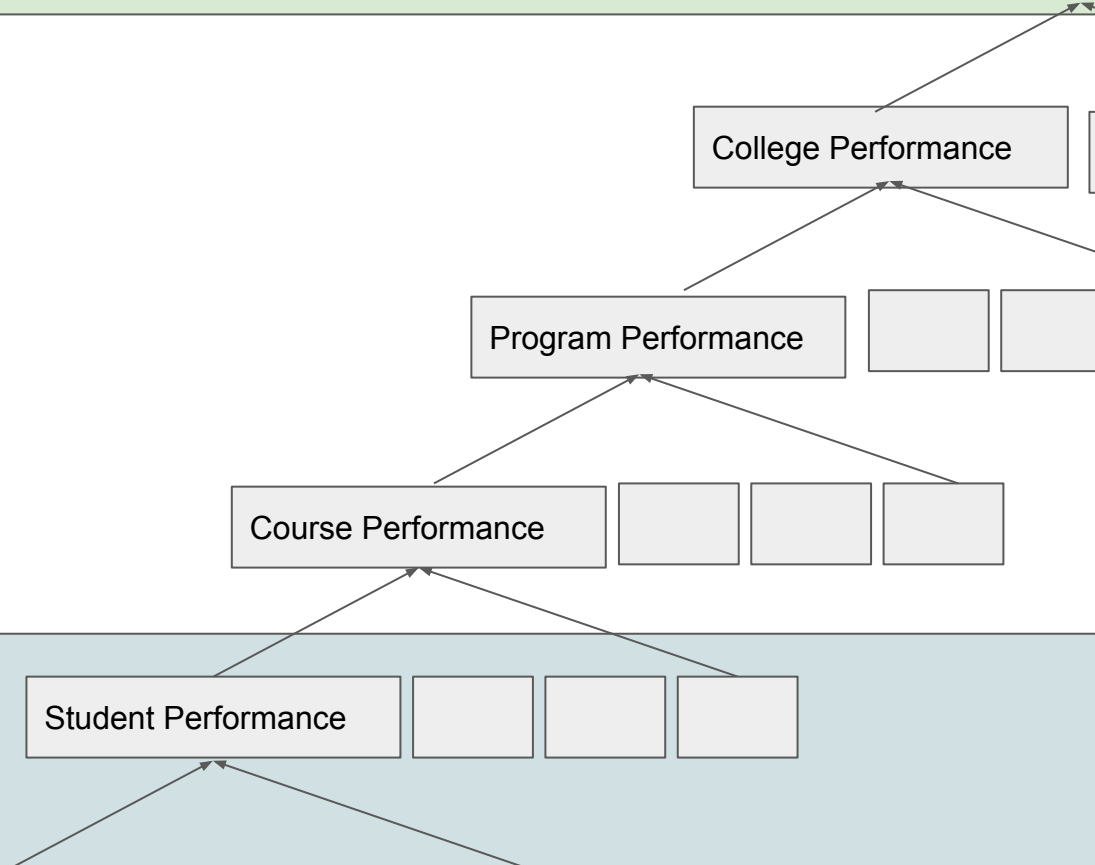
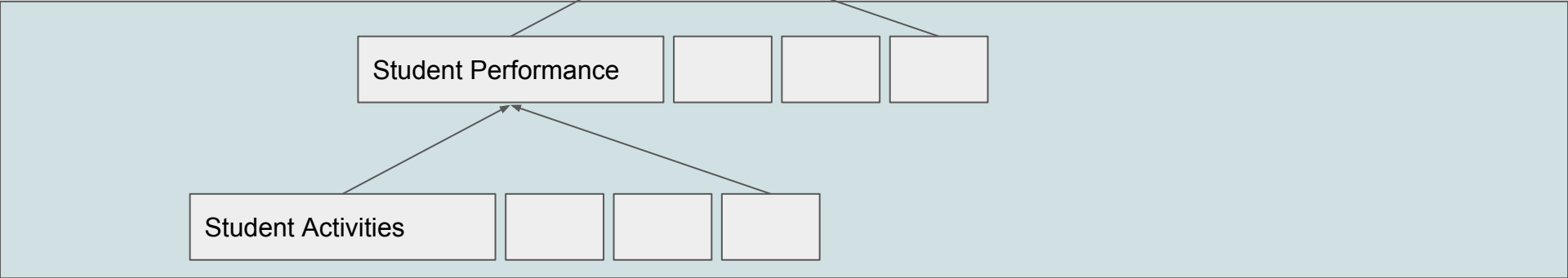
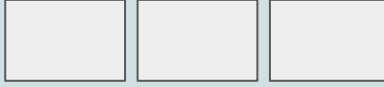
Course Performance



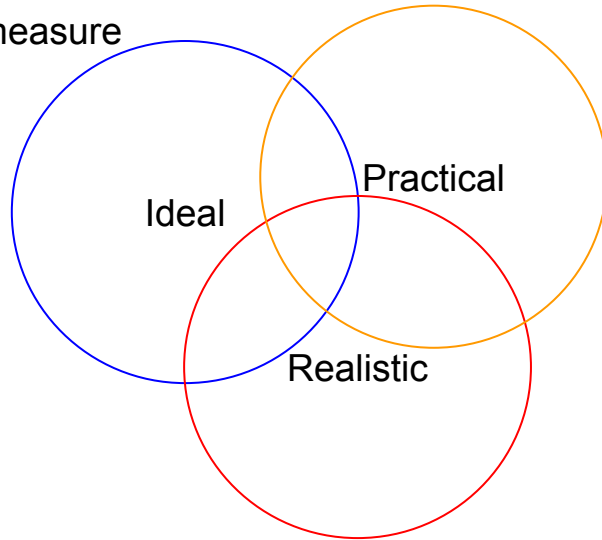
Student Performance



Student Activities



- Exact thing we'd like to measure
- As precisely as possible
- From many observations



- Duration of course
- Number of students
- While juggling other duties

- End-state or change in state?
- Indirect indicators
- Measurement noise

Types of Assessment

Course level assessment

- Submitted by ACT instructors
- Based on individual student artifacts
- Focused on ACT-SLO's
- 3-level Assessment protocol
 - Excellent
 - Acceptable
 - Unacceptable
- Reports and analysis
 - Class level
 - College level
 - Element of thought level

University level assessment

- External (purchased) assessment
- Voluntary student participation
- Graduating student samples
 - Beginning first year samples
 - No starting data for transfers
- Assessments considered
 - Cornell Critical Thinking Skills Test
 - Low voluntary participation
 - ETS Proficiency Profile
 - Does not map well to FYS
 - National Survey of Student Engagement
- Assessments in development
 - Pre-Post survey (FYS and Capstone)



Quality Enhancement Plan

ACT - Applied Critical Thinking - Spring 2017

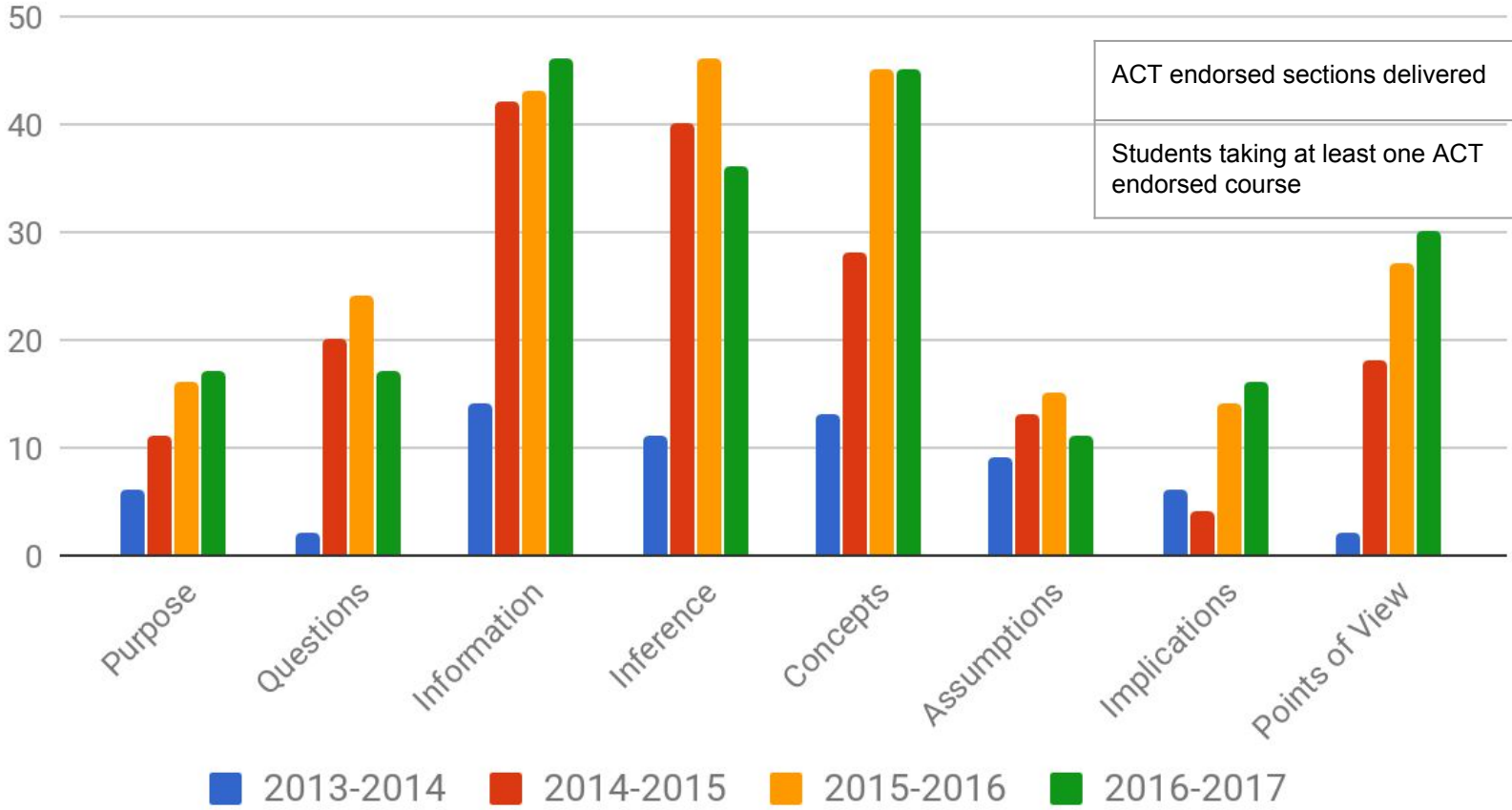
Directions: Please rate **at least three Elements of Thought** and **at least one of the 4Cs** using the following rating scale: 3=excellent, 2=acceptable, 1=unacceptable. Please describe artifact in the Notes box and provide an electronic copy of the artifact to Cecelia Croft at croft@uhcl.edu.

Class Nbr 10270 Instructor ID 9999999 Instructor Last Name Voelker Instructor First Name Troy Subject MGMT Catalog 3301 Section 11 School BUS

Notes:

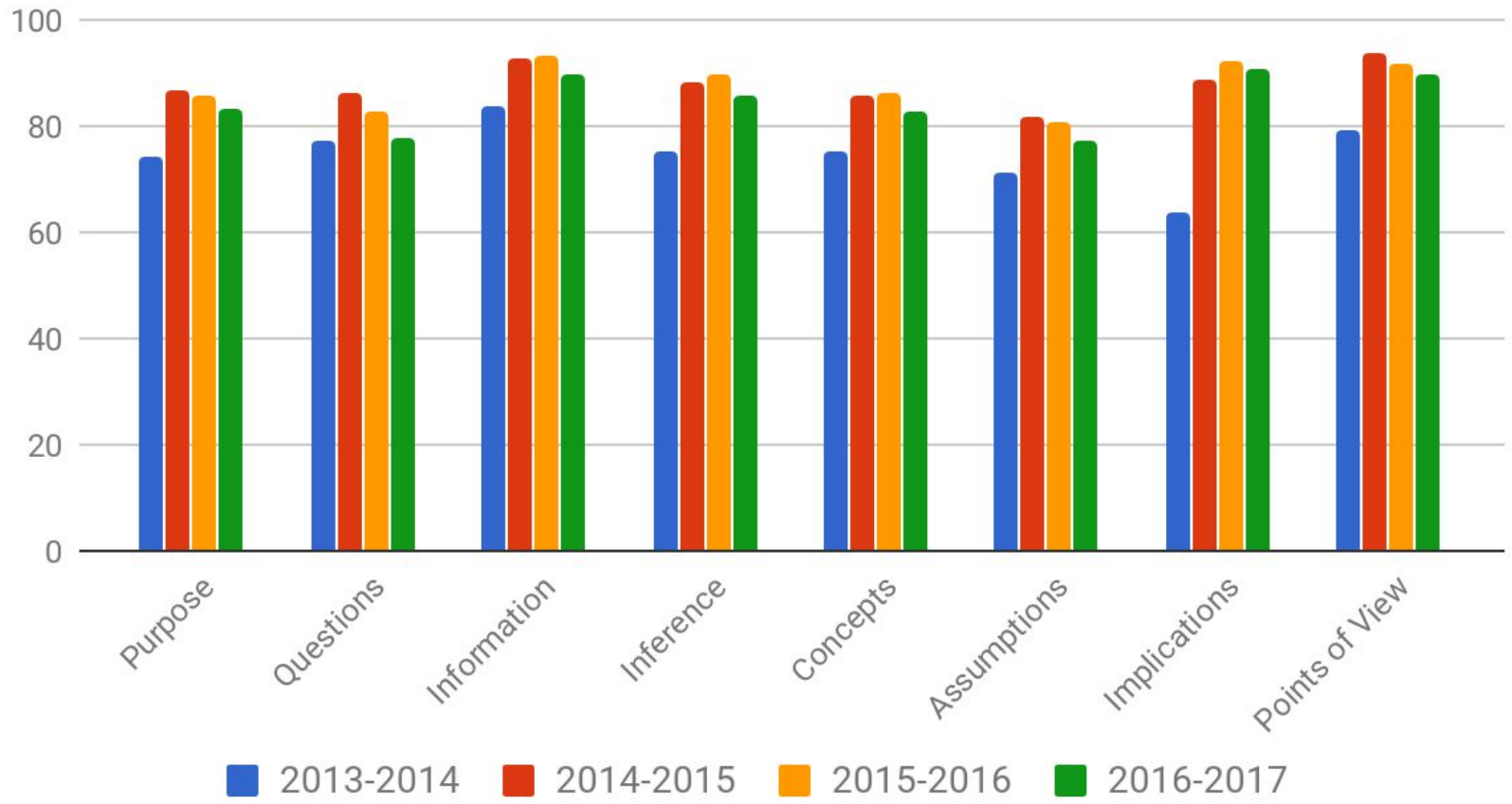
Student ID	Last Name	First Name	Artifact	Critical Thinking Competencies (Elements of Thought)								The 4Cs					
				Purpose	Question at Issue	Information	Interpretation and Inference	Concepts	Assumptions	Implications/Consequences	Point of View	Curiosity	Connections	Creativity	Communication		
1	9999999	Student	Name	Exams (MT and Final)		2				2	3		2				3
2	9999999	Student	Name	Exams (MT and Final)		3				2	3		3				3
3	9999999	Student	Name	Exams (MT and Final)		1				2	1		2				2
4	9999999	Student	Name	Exams (MT and Final)		2				3	2		3				2
5	9999999	Student	Name	Exams (MT and Final)		2				2	3		3				3
6	9999999	Student	Name	Exams (MT and Final)		3				3	2		2				3
7	9999999	Student	Name	Exams (MT and Final)		2				2	1		2				2
8	9999999	Student	Name	Exams (MT and Final)		2				2	2		1				2
9	9999999	Student	Name	Exams (MT and Final)		1				2	2		2				2
10	9999999	Student	Name	Exams (MT and Final)		1				3	2		2				2
11	9999999	Student	Name	Exams (MT and Final)		2				2	2		2				3
12	9999999	Student	Name	Exams (MT and Final)		3				2	2		3				3
13	9999999	Student	Name	Exams (MT and Final)		3				2	2		3				3
14	9999999	Student	Name	Exams (MT and Final)		3				2	3		2				2
15	9999999	Student	Name	Exams (MT and Final)		2				3	3		3				3
16	9999999	Student	Name	Exams (MT and Final)		2				3	2		2				2
17	9999999	Student	Name	Exams (MT and Final)		2				1	2		1				1
18	9999999	Student	Name	Exams (MT and Final)		1				2	1		2				2
19	9999999	Student	Name	Exams (MT and Final)		1				2	1		2				1
20	9999999	Student	Name	Exams (MT and Final)		2				1	2		2				2
21	9999999	Student	Name	Exams (MT and Final)		2				2	1		1				1
22	9999999	Student	Name	Exams (MT and Final)		2				2	2		2				2
23	9999999	Student	Name	Exams (MT and Final)		2				2	3		3				2

ACT Sections offered by Element of Thought (from ACT-SLO)



ACT endorsed sections delivered	208
Students taking at least one ACT endorsed course	4,225

Satisfactory (or better) Passing Rate by Element of Thought



Pre-Post Survey (Pilot Stage)

Purpose - Do students in ACT courses differentiate their experiences in ACT courses from their experiences in non-ACT courses?

Instrument - 13 items (originally 19). Likert-scale anchored by either Strongly Agree/Disagree or Endorse ACT/non-ACT course.

Intended Method - Survey of First Year Seminar and Capstone course (by college and program) with possible inclusion of a high-activity transfer course.

Current Method - Pilot taken from students participating in at least one ACT course (136 respondents)

Characteristics of Sample

First Year	13
Second Year	8
Junior Year	45
Senior	22
Post-Bac	12
Masters	36

BUS	48
COE	11
HSH	27
CSE	50

Male	37
Female	99

Why did you take an ACT course?

Required Course (only option)	67
N/A	39
Professor	12
Timing	10
An ACT Course	6
Other (offered reason)	2

Attitudes towards their ACT course

Would you seek out an ACT course?

Strongly Agree	24
Somewhat Agree	31
Neither Agree or Disagree	31
Somewhat Disagree	6
Strongly Disagree	7

I prefer ACT courses

Strongly Agree	23
Somewhat Agree	33
Neither Agree or Disagree	32
Somewhat Disagree	6
Strongly Disagree	6

I would seek out ACT professors

Strongly Agree	23
Somewhat Agree	36
Neither Agree or Disagree	33
Somewhat Disagree	4
Strongly Disagree	4

The ACT course improved my skills

Strongly Agree	43
Somewhat Agree	33
Neither Agree or Disagree	18
Somewhat Disagree	2
Strongly Disagree	4

Impact of ACT Courses

CT is easy

Strongly Agree	14
Somewhat Agree	32
Neither Agree or Disagree	30
Somewhat Disagree	21
Strongly Disagree	3

CT is useful

Strongly Agree	64
Somewhat Agree	27
Neither Agree or Disagree	6
Somewhat Disagree	0
Strongly Disagree	2

I will use ACT in other classes

Strongly Agree	44
Somewhat Agree	34
Neither Agree or Disagree	16
Somewhat Disagree	3
Strongly Disagree	3

I will use ACT in life

Strongly Agree	39
Somewhat Agree	33
Neither Agree or Disagree	22
Somewhat Disagree	3
Strongly Disagree	3

Comparing ACT and non-ACT courses

I prefer the way
___ delivers
material

Strongly prefer ACT	50
Somewhat Prefer ACT	32
No Preference	30
Somewhat Prefer Non-ACT	4
Strongly Prefer Non-ACT	4

I prefer the
difficulty of
assessment

Strongly prefer ACT	37
Somewhat Prefer ACT	28
No Preference	38
Somewhat Prefer Non-ACT	11
Strongly Prefer Non-ACT	6

My effort to learn
course material

Strongly prefer ACT	39
Somewhat Prefer ACT	43
No Preference	29
Somewhat Prefer Non-ACT	5
Strongly Prefer Non-ACT	4

Engagement

Strongly prefer ACT	56
Somewhat Prefer ACT	32
No Preference	22
Somewhat Prefer Non-ACT	5
Strongly Prefer Non-ACT	4

Learning helps in
other courses

Strongly prefer ACT	52
Somewhat Prefer ACT	37
No Preference	23
Somewhat Prefer Non-ACT	2
Strongly Prefer Non-ACT	5

Statistically Significant Differences

Overall Satisfied with ACT courses (p=.018)

	Strongly Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Somewhat Disagree
Male	4	1	3	11	14
Female	0	1	11	26	48

Examination of NSSE Data

National Survey of Student Engagement (NSSE)

- Used to measure student participation at Universities and Colleges in the United States and Canada
 - Student Participation is linked to learning and engagement
 - NSSE assesses effective teaching practices and student engagement in an educational and purposeful activity
- Indiana University School of Education Center for Post -Secondary Research

Intended Use

- Administrators
- Faculty

Data and Measures

- Over 200 items (some year to year variance)
- Four Categories
 - Academic Challenge
 - Learning with Peers
 - Experience with Faculty
 - Campus Environment

UHCL Experience with NSSE

- Collected since 2014
 - Used as exit survey (undergraduate only)
 - Very small sample of first-year students
 - Voluntary Participation (about 20% of graduating students)
 - Questions emphasize experience in the most recent academic year
- UHCL Data to date
 - 1955 respondents (2014 to 2016)
 - UHCL total student population is 8500
 - Historically UHCL is about 50% graduate enrollment
 - Our approach to the data
 - Examining emergent critical thinking scales
 - Comparing established scales ACT vs. non-ACT

Our Sample

Gender

- Female=1218,
- Male=470

Status

- First-year=54, Senior=1634 (undergraduate only)
- Not full-time=807, Full-time=881
- First Generation yes = 973, no = 465

ACT Participating Student

- 0=1477,
- 1=177,
- 2=31,
- 3=3

Colleges:

- Business=432,
- Education=334,
- Science and Engineering=312,
- Human Sciences and Humanities=610

Directionally Significant Results

Scale or Item [p-value]	ACT Students	Non ACT Students
Scale - Quantitative Reasoning [p=.005]	31.79	28.07
Scale - Collaborative Learning [p=.018]	33.10	30.55
Item - Perceived gain with analysis [p<.001]	3.10	2.82
Item - Combined Ideas from different courses when completing assignments [p=.076]	3.07	2.96

Student Objectives

1. Students will use **curiosity** to identify a particular problem or area of interest within the discipline.
2. Students will make **connections** to their particular issues or problems based upon evidence acquired by research methodologies and citation methods within their discipline
3. Students will demonstrate through **creativity** a divergent mental approach exploring original alternative views and solutions.
4. Students will **communicate** outcomes through writing and or presentations.

Contrary Findings (or are they?)

Scale or Item (p-value)	ACT Students	Non ACT Students
Scale - Reflective and Integrative Learning [p=.031]	37.37	39.42
Scale - Student-Faculty Interaction [p=.073]	17.83	19.97
Item - Included diverse perspectives in discussions or assignments. [p<.001]	2.44	2.71
Item - Examined strengths and weaknesses of their own views on a topic or issue. [p=.047]	2.80	2.92
Item - Tried to better understand someone else's views by imagining... perspective. [p=.013]	2.85	3.01
Item - Learned something that changed the way they understand an issue or concept. [p=.012]	2.85	3.01

Element of Thought	Cronbach's Alpha (number of questions)	
	Perception	Behavior
Purpose	.71 (4)	.78 (5)
Questions and Issues	.73 (5)	.80 (5)
Information	.73 (7)	.83 (6)
Inference	.81 (8)	.86 (8)
Concepts	.75 (5)	.83 (6)
Assumptions	.73 (4)	.76 (5)
Implications	.76 (6)	.81 (4)
Points of View	.76 (5)	.80 (4)

Interactive Session

Assessment Across the University
Who, What, Where, When, Why, and How?

Plans for this session

1. Divide room into groups, each focused on a different level of analysis for assessment within a University
2. Engage each group in an Element of Thought driven discussion pertaining to that group's level of consideration
3. Invite each group to share their findings with the remaining groups
4. Please have one person in each group record notes as well as possible.
 - a. We will collect notes at the end of the session for transcription
 - b. Notes will be shared with all interested session participants

Step One

Divide into approximately six groups. Each group will focus on a single echelon of assessment as indicated by a color band on this slide.

The facilitator will help organize the room. Depending on the number in attendance, there may be more than one group working on each echelon.

University Performance

S

College Performance

Program Performance

Instructor Performance

Course Performance

Modality?

Student Performance

What is the Purpose?

“Your purpose is your goal, your objective, what you are trying to accomplish. We also use the term to include functions, motives, and intentions. You should be clear about your purpose, and your purpose should be justifiable.”

The Thinker's Guide to Analytic Thinking, pg. 14

1. What is your purpose in assessing this echelon?
2. What is your central aim in assessing this echelon?
3. What is it you are hoping to accomplish, or learn, as you assess this echelon?
4. What is performance at this echelon?

Please do NOT begin to discuss data, facts, or evidence
that may (or may not) be available at this time.

Step Two

Discuss possible purposes for assessment of this echelon.

For now, do not try to settle on a single, "best" purpose. Rather, try to entertain and consider several possible purposes as well as justification for that purpose.

University Performance

College Performance

Program Performance

Instructor Performance

Course Performance

Modality?

Student Performance

What are the Questions and Issues?

“The question lays out the problem or issue and guides our thinking. When the question is vague our thinking will lack clarity and distinctiveness.”

The Thinker's Guide to Analytic Thinking, pg. 15

1. What important questions are embedded in assessing this echelon?
2. What complicates assessing this echelon?
3. What important questions must be addressed in order to assess this echelon?

Please note the “Be Aware” comment at the bottom of pg. 15.

Step Three

Enumerate the important questions and issues pertaining to assessment of this echelon.

Do not try to answer, or resolve, these questions and issues. Rather, try to uncover hidden obstacles that must be considered.

University Performance

College Performance

Program Performance

Instructor Performance

Course Performance

Student Performance

What Information do we have (need)?

“Information Includes the facts, data, evidence, or experiences we use to figure things out. It does not necessarily imply accuracy or correctness.”

The Thinker's Guide to Analytic Thinking, pg. 16

1. What information do we need to answer our questions for this echelon?
2. What relevant data exists (or could exist) for this echelon?
3. How would we know if the information is accurate (or relevant) for this echelon?

Please note the “Be Aware” comment at the bottom of pg. 16.

Step Four

Consider the types of information that are (or could be) available for this echelon. Are there specific questions we would like to address for which information doesn't (or perhaps couldn't) exist?

Consider the availability, complications, and access as you think about information.

University Performance

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Modality?

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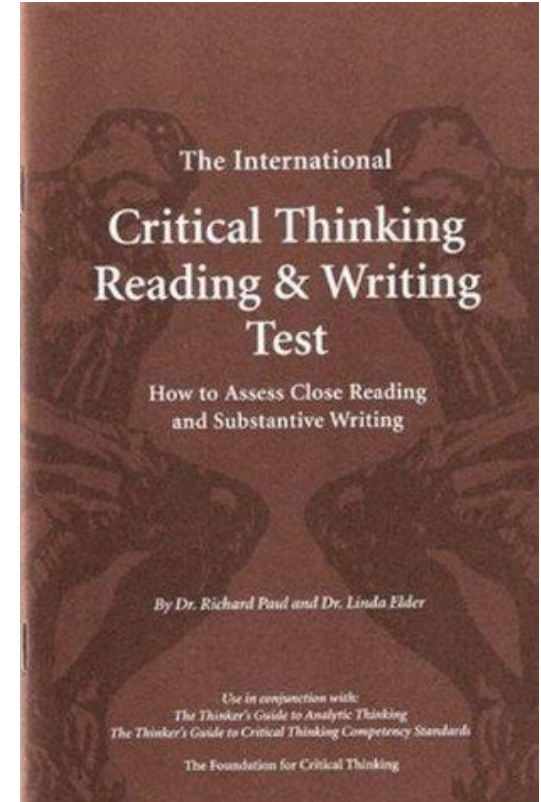
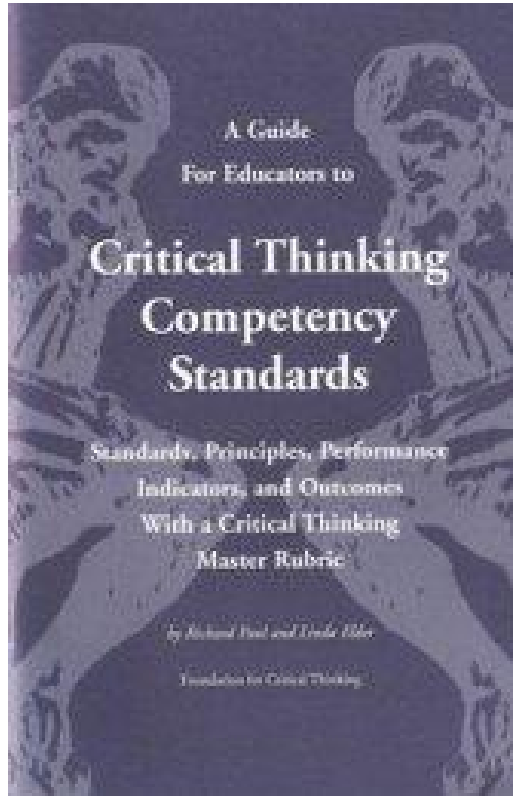
Let's share our findings

Step Five

- Consider your group's past three discussions (Purpose, Questions, Information). What important themes or ideas emerged?
- Nominate a group member to share this information
- Briefly present your findings
 - Please remind us the echelon of assessment your table addressed
- Please turn in your group's discussion transcription

Reminder - Give us your email address if you want transcribed session notes.

Helpful Readings



Direct and Indirect evaluation

Direct Critical Thinking questions

- Asking them a question related to a specific element of thought.
- Asking them to organize their thinking using the wheel.
- Asking them to reason through a problem or issue (specifically providing you a reasoning statement of some sort).

Indirect Critical Thinking questions

- Asking a process related question - inferring strength or weakness of critical thinking from the quality of the process.
- Asking an analytic/interpretive question - inferring strength or weakness of critical thinking from the material included in the analysis/interpretation.
- Asking an open-ended exploratory question and inferring strength or weakness of critical thinking from the structure of the response.

Example of a Direct Evaluation

MGMT 6731: Seminar in Strategy

Weekly Reading response to Jay Barney's RBV Theory

“What are the firm and industry level assumptions necessary for a resource based advantage?”

Unacceptable

- non-specific assumptions or trivial assumptions
- Unable to articulate an assumption
- Assumptions which are not associated with this theory

Acceptable

- General description of either firm or industry level assumptions
- May offer an example
- Tend to state assumptions as absolutes, not contingencies (“This works because, as we know, all firms are different”)

Excellent

- Reasonable grasp of both firm and industry assumptions
- Tends to notice linkages between this assumption and other readings
- Tends to notice contingent nature of these assumptions

Example of an Indirect Evaluation

MGMT 4312: Strategic Management

Mid-term Financial Statement Analysis test

1. Describe and explain the return on equity performance for the Cheesecake Factory.

Information	Assumptions	Conclusions
<ul style="list-style-type: none">• Do they use the correct ratios in their response?• Do they interpret them in a logical manner?• Do they make use of the appropriate comparatives?	<ul style="list-style-type: none">• Do they decompose ROE components in their response?• Do they recognize the role of profit and capital structure in their interpretation?	<ul style="list-style-type: none">• Do they confine their conclusions to the relevant metrics?• Do they integrate the information and assumptions logically?