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Abstract
Elements of what we are calling a "hopeful pedagogy" emerged when faculty reflected on the question - Do you think your current approach to develop CT in students is successful? Faculty across disciplines and institutions used the word "hope" to characterize the outcome of their efforts. While attempting to disentangle the "hopeful pedagogy", we found answers in (a) how faculty defined CT in disciplinary and non-disciplinary contexts; (b) a misalignment between faculty and institutional approaches to CT; (c) a disconnect between faculty and their own approaches to CT, and (d) logistical and curricular issues within general education programs that placed constraints on the ability of faculty to adequately focus on CT. The "hopeful pedagogy" brought to the forefront the serious implications of a misaligned system for student learning, faculty engagement, institutional improvement and accountability.

Keywords
Critical Thinking, Higher Education, Faculty Development, Hopeful Pedagogy

A Hopeful Pedagogy to Critical Thinking

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Elements of what we are calling a "hopeful pedagogy" emerged when faculty reflected on the question - Do you think your current approach to develop CT in students is successful? Faculty across disciplines and institutions used the word "hope" to characterize the outcome of their efforts. While attempting to disentangle the "hopeful pedagogy", we found answers in (a) how faculty defined CT in disciplinary and non-disciplinary contexts; (b) a misalignment between faculty and institutional approaches to CT; (c) a disconnect between faculty and their own approaches to CT, and (d) logistical and curricular issues within general education programs that placed constraints on the ability of faculty to adequately focus on CT. The "hopeful pedagogy" brought to the forefront the serious implications of a misaligned system for student learning, faculty engagement, institutional improvement and accountability.

INTRODUCTION

Critical thinking (CT) was embraced as an important aspect of learning by Universities in the United States in the early eighties. Today, several leading universities showcase CT in their mission statements (Zamon, 2008) and influential regional, national and professional accrediting agencies require evidence of outcomes like CT in graduates of institutions they accredit. Yet, the narrative that surrounds higher education indicates that students are not learning important life skills like CT. The content of the narrative is evident in titles of recent bestselling books on the state of student learning in higher education – Bok (2006) published, Our Underachieving Colleges - A candid look at how much students learn and why they should learn more; Arum and Roska penned, Academically Adrift: Limited learning on college campuses, where they stated student "gains in critical thinking, complex reasoning, and written communication are either exceedingly small or empirically nonexistent" (2010, p.147); Hacker and Dreifus (2010) wrote, Higher Education?: How colleges are wasting our money and failing our kids. It is no coincidence that the voices for accountability in higher education have grown louder in recent years.

Consequently, public accountability systems like the Voluntary System of Accountability (VSA) and the Multi-State Collaborative, which are responses by public universities to the Spellings Report (USDE, 2006; SHEEO, n.d.) have mushroomed requiring participant institutions to assess and publish value-added gains by students in CT (NASULGC, 2007). The movement for accountability received further attention when President Obama identified and initiated a process to tie federal funding for higher education with accountability measures like a college ranking system (Fain, 2013).

The intense focus on student learning by advocates of accountability is largely seen as emerging from a deficit narrative in which faculty and institutions are found wanting in their role in ensuring student learning. Consequently, there are multiple reactions to the accountability movement in higher education. Some reject accountability as intrusive and oppressive to faculty and institutions of higher education, some remain neutral or indifferent while others embrace it as an opportunity to reflect on the integrity and strength of our practice as faculty and institutions. In this paper we take the latter approach.

Our objective in this study is to examine how faculty in the humanities, natural sciences and social sciences approach CT in general education (GE) and how faculty and institutions gauge the effectiveness of their pedagogical and curricular efforts aimed at developing CT in students.

BACKGROUND

CT in the Research Literature

CT as a concept has historically grown out of the discipline of philosophy (Battersby, 1989). Within philosophy, CT was grounded in a literature that was theoretical in nature and closely aligned with formal logic. As a cognitive skill, CT has strong underpinnings in the discipline of psychology. Psychometricians were interested in measuring CT as a cognitive skill and developed a number of tests to assess CT. When applied to various contexts in higher education, theorists and practioners have developed multiple models for applying CT within pedagogy and curriculum (Facione, 1990; Perkins, Jay, & Tishman, 1993; Watson & Glaser, 1980). The diverse disciplinary influences on CT, coupled with the wide ranging spectrum of interest from various stakeholders and researchers has meant that CT as a concept is the result of an assimilation of often varied and competing ideas, philosophies and interpretations (Moore, 2014; Bahr, 2010). Consequently, the research literature does not offer a standard definition of CT, or a standard taxonomy of CT skills or dispositions.

Critical Thinking: Ontologically discipline-specific or general?

The ontological debate on whether CT is discipline-general or specific was abuzz in the eighties. Arguments presented on both sides were largely theoretical and polemical. The group of scholars who expounded the discipline general nature of CT were termed generalists (Ennis, 1985; Glaser, 1985; Swartz, 1987) and those that argued that CT was discipline-specific were labeled specifists (Colucciello, 1997; Donald, 2002; McPeck, 1981, 1990; Tucker, 1996). As discipline-general, CT skills are assumed to transcend disciplinary discourses and methods and "can be applied to all disciplines and subject-matter indiscriminately" (Davies, 2006, p.1). Therefore,

CT can be taught outside the context of a specific discipline (Moore, 2011) and the "general skills of CT can help us assess reasoning independent of the vagaries of the linguistic discourse we express arguments in" (Davies, 2006, p.1). The assessment

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model that grew from this tradition focuses heavily on rationalistic components of CT and uses formal logic, and deductive reasoning as the basis to teach and assess CT (Papastephanou & Charoula, 2007).

Proponents of the discipline-specific approach argued that CT is contextual and therefore needs to be taught and assessed in specific contexts (Moore, 2011). McPeck (1981) argued that CT is subject specific and therefore not all CT skills and dispositions are transferable across subject areas. Hence Collucciello (1997) argued in favor of using discipline-specific criteria to assess CT.

More recent research into this ontological question have adopted an empirical approach. (Jones, 2007; Moore, 2011; Ikuenobe, 2001; Davies, 2006; Davies, 2013). From this research emerged discussions on a hierarchy of CT skills. Davies (2013) advocated that the general skills of CT should form the foundation for CT upon which unique disciplinary skills of CT sit. He argued that the general skills should be used as the basis for teaching CT in undergraduate education. Those who counter argued Davies' position used a relativist approach and argued that there was no particular hierarchy of CT skills. The relativist position is inclusive of both the generalist and specific approaches to CT. Despite the recent research into the disciplinary nature of CT, there is no agreement on whether CT is ontologically discipline-specific or general. Moore (2011) argued that the debate is currently at an "impasse" (p. 264).

Some researchers have focused on epistemological influences on the processes and outcomes of CT (Battersby, 1989; Kuhn and Weinstock, 2002; Nicholas 2011). At the core of CT and personal and disciplinary epistemology are processes that individuals use to justify knowledge and the criteria used to establish truth, knowledge or belief systems. There is a growing recognition on the influence of personal and disciplinary epistemology in how CT is expressed, taught and assessed in various disciplinary contexts (Nicholas & Labig, 2013). Nieto and Saiz (2011) called for more empirical research into the role that epistemology played in CT. This move in the literature from purely ontological discussions on the discipline generality or specificity of CT to also embrace epistemological applications raises the question of whether standard or universal definitions and criteria can be applied when teaching or assessing CT. Hence, for purposes of this study, we adopted an exploratory approach and did not use a standard definition of CT. We wanted to examine how faculty used and applied the term within the classroom and in disciplinary contexts.

Critical Thinking in General Education

The GE program is at the heart of the undergraduate curriculum and was designed to contribute toward a broad, balanced and liberal education (Allen, 2006). Critical thinking lies at the core of achieving the mission of a liberal education through GE. Consequently, it is difficult to find a general education program that does not include CT as a core pedagogical and curricular outcome (Zamon, 2008).

There are several assumptions within which CT operates in GE. First is that CT is discipline-general. This assumption is pervasive and underlies most of the instruments used in the literature and accountability movements to assess student gains in CT. The second assumption is that CT is a developmental and complex skill that is learned over time and through developmental processes. Third, in terms of curricular application of CT in GE, Ennis (1989) observed what he described as an "immersion approach" (p. 4) in which students are immersed into the subject matter in a thoughtful manner and CT is taught implicitly through disciplinary content.

Faculty and Critical Thinking

While there is much disagreement on the definition, nature and scope of CT, the only area in which there is agreement is that the teaching of CT is "an intrinsic good" (p. 261) and an integral goal of higher education (Moore, 2011). Early research on faculty approaches to CT largely focused on their knowledge of the term. In a study, Paul, Elder and Bartell (1997) concluded that 89 percent of faculty claimed to be teaching for CT but only 19 percent of them could define CT and only 9 percent were teaching to develop CT in the classroom. The study questioned whether faculty could teach CT if they could not define the term. However it must be pointed out that the Paul et.al (1997) study used a standard definition of CT to evaluate faculty responses.

More recent research on how faculty teach CT found that faculty generally experimented with pedagogical approaches when teaching CT (Halx & Reybold, 2005). The study reported that most faculty were good critical thinkers themselves, and supported the application of CT as part of their teaching mandate. However, Halx and Reybold (2005) treated faculty as a monolithic bloc without disciplinary analysis. When examining faculty approaches to assessing CT in the classroom, Nicholas and Labig (2013) found that faculty assessed CT implicitly through disciplinary assignments. Research indicates that while faculty are trained as disciplinary experts, they are not always socialized into institutional cultures, classroom cultures or assessment methods (Austin, 2002). The literature also reveals that in addition to practice and training, affective elements like positive mood and classroom culture have enhancing effects on the development of CT (Lewine, Sommers, Waford & Robertson, 2015). There is need for research that examines how the implicit, experimental pedagogical approaches used by faculty align with the assumptions with which CT is incorporated into GE curriculum and assessment.

Given that faculty, institutions and accountability movements are all engaged with assessing CT, it is important to scrutinize how the various approaches to assessing CT are correlated. Stassen, Herrington, and Henderson (2011) compared their institutional definition of CT with those that underlie the three VSA recommended standardized tests. They found little in common between their university's definition of CT and the definitions used in the three VSA recommended standardized tests. Halpern (1993) wrote that not much is known about whether or how students develop unique traits of critical thinking skills in various disciplines. Banta and Pike (2007) when analyzing institutional scores on a discipline-general CT test like the CLA, found sizable variance when results were disaggregated by disciplinary major. These studies raise enough questions to further investigate the disciplinary differences in CT. Banta (1991) wrote, "the level of mystery about what should be done to improve low scores is intensified by the lack of detailed knowledge about the methods faculty are using to deliver the knowledge and skills associated with an institution's goals for general education." (p. 206).

Consequently, important questions remain unexplored - How do faculty across multiple disciplines approach CT in GE? How does the multi-disciplinary GE curriculum taught by faculty

across departments converge to deliver complex, developmental skills like CT? How do the approaches used by faculty, institutions and accountability movements align to adequately provide valid indicators on how undergraduate students develop as critical thinkers?

Guiding Research Questions

We began the study by asking two questions: (a) what do faculty think about the levels of CT in students and (b) how do faculty evaluate the efficacy of their classroom approaches aimed at developing CT in students? When answering those questions, we found what we called the "hopeful pedagogy" to CT. Then we asked additional questions like: How do faculty in the Humanities, Natural Sciences and Social Sciences approach CT in the classroom? What are logistical/operational and philosophical frameworks within which faculty and institutions work to develop CT in students? These questions were explored in order to disentangle the hopeful pedagogy to CT.

RESEARCH PROCEDURES

Location

This study was conducted at two large public universities that shared similarities regarding their assessment of CT and their general philosophy regarding GE. Located in the Midwest, the first university enrolled around 36,000 undergraduate students. The other, in the Southwest, enrolled around 20,000 undergraduate students. Both universities are part of the Voluntary System of Accountability (VSA) for reporting GE outcomes like CT using College Portrait ®. Classified as Research One universities by the Carnegie Foundation, their GE programs were accredited by the Higher Learning Commission and North Central Association of Schools.

For purposes of VSA accountability, both schools used discipline general tests. One school used the Proficiency Profile; a standardized test from ETS. The other piloted the use of the Collegiate Learning Assessment (CLA). Both universities had recently redesigned their GE programs to achieve breadth of knowledge. Thus, while the size of the universities differed, their approach to CT and GE were aligned.

Sampling

The sampling methods in this study were a combination of stratified sampling (Miles & Huberman, 1994; Patton 2002) and homogenous sampling (Miles & Huberman, 1994). The GE disciplines (Allen, 2006) were organized into three clusters as represented in the table below:

Discipline Cluster	Disciplines
Humanities	Literature, Languages, Philosophy, Studio Arts, Ethics, Design
Natural Sciences	Chemistry, Physics, Biology, Botany
Social Sciences	Sociology, Economics, Psychology

Each of the 17 faculty members who participated in the study taught GE courses in one of the discipline clusters.

Data Collection

A qualitative interview method was used in order to help capture the participants' voices (Merriam, 1998), provide an opportunity for the researcher to dialog with participants and co-construct meaning within contexts (Patton, 2002, p. 196). Nine faculty members (3 from each discipline cluster) were interviewed individually using a semi-structured interview guide. The interviews focused on (a) pedagogical approaches to CT (b) attributes faculty associated with CT (c) approaches used to assess CT, and (d) general attitudes toward institutional assessment of CT. Each interview lasted an hour, was audio recorded and transcribed verbatim.

Focus group methodology (Krueger & Casey, 2000) was also used in order to elicit multiplicity of perspective (Morgan, 1996). This methodology helped corroborate patterns (Cohen & Crabtree, 2006) observed in individual interviews. A focus group comprising of 8 faculty members (different from individual interview participants) from disciplines in the social sciences, natural sciences and humanities met for approximately one hour. This group size conformed to Litchman's (2010) recommendation of 6-12 individuals for a focus group discussion. Faculty discussed their understanding of CT, assignments/instruments developed to assess for CT, and the challenges and possibilities of their approaches.

Data Analysis

We approached the research questions using inductive, interpretive and qualitative approaches. Data from interviews and focus group discussions were consolidated and coded using NVivo 9.0. The primary qualitative coding approach used was that of Grounded Theory: open coding, axial coding, and selective coding (Glaser & Strauss, 1967). Our goal during the open coding phase was to, as Patton (2002) put it, break apart data and delineate larger themes and concepts. Thereafter, axial coding (Glaser & Strauss, 1967) was used to assemble the coded data around new categories. As suggested by Strauss and Corbin (1990), we brought data together using "conditions, context, action/interactional strategies and consequences" (p. 96). The emergent concepts derived through axial coding were selectively coded (Strauss & Corbin, 1990) to understand how faculty approached CT in the classroom. When presenting data, we consolidated findings from interviews and focus group discussions categorized by disciplinary affiliation of faculty.

The findings from the grounded theory coding strategies led us to questions that required additional approaches to analyze data. To study the "hopeful pedagogy" further, we found it useful to apply aspects of the Listening Guide methodology (Gilligan, et. al., 2003). The Listening Guide assists researchers in becoming attuned to relational strands that are more hidden and less overt in the data (Raider-Roth, 2005). The Listening Guide suggests four distinct "listenings" to narrative data. The first listening, often referred to as the "plot" listening, attends to the stories told, the narrative landmarks (repeated phrases, seeming contradictions, fluid and attenuated speech patterns, and thematic strands). For the purposes of this study, the Grounded Theory coding served as our first listening. In addition, the first listening asks the researcher to listen for silences, for negation, or other ways in which the participant may leave out significant aspects of their ideas. The second listening, often referred to as the "I listening" attends closely to the "I voice" used in the participant's narrative, as a means to hear how the participants speak about themselves in reference to the questions being asked. Often times, it is helpful to listen for the internal dialogue that the participants have in their narrative by

juxtaposing the "I voice" with other pronomic voices such as "you" or "we." In order to listen in this way, we extracted the "I" phrases (I + verb) in sequential order to form what has been called an "I poem." (Gilligan et al 2003). In doing so, we created data displays (Miles & Huberman 1994) that help illustrate core aspects of the narrative. It is this listening that was most helpful in understanding the meanings embedded in the "hopeful pedagogy".

The Listening Guide also suggests third and fourth listenings, referred to as contrapuntal listenings, which ask the researcher to listen to thematic threads or voices in tension and harmony. As a secondary form of analysis, we did not implement this dimension of the methodology.

Trustworthiness

The study used several strategies recommended by Maxwell (1996), Miles and Huberman (1994) and Johnson (1997) to establish trustworthiness. We selected establishing reflexivity, triangulation among data sources, multiple sampling techniques, maintaining validity of description and the use of multiple data analysis techniques as strategies for lending credibility to findings.

FINDINGS

Faculty Were Discontented with the Level of CT in Students

Faculty in this study were unanimous that CT was integral to an undergraduate education. The economist captured it well, "Critical thinking is of extreme importance. Without critical thinking, economics is useless." However, faculty also unanimously expressed frustration with the level of CT in students. The philosopher remarked, "the level is quite poor… still well lower than I think it should be." A colleague from romance languages said "students don't seem as inclined to ask questions or take things in opposition or propose an alternative." She identified the students' lack of effort as problematic, "A number of them don't try to reach for anything at all and that's a tragedy. If they want to reach an odd or bizarre truth, that's alright too, at least it's activity. But if you are completely static, nothing will occur."

Faculty particularly expressed concern about students who were able to acquire reasoning skills and content knowledge but were unable to make critical application. An economist complained, "I mean, that's very frustrating, some students…they cannot make the jump from just being commonsensical to a more insightful analysis, um, understanding of what's going on... they just cannot make the connection" The chemist said "I see it all the time, people who do extremely well on testing…but they have really no understanding what the meaning of the answer is." The following exchange with a colleague in botany further captures faculty frustration with students' inability to make critical application:

> Botanist: I think that some people, you work with them and teach them, but some people, they just, it's, you know, they just don't have that spark. They just you know, they just learn stuff and can't do things.
>
> Interviewer: So they can reach that stage where they are able to reason, but not able to go beyond.
>
> Botanist: Yeah, I think so. They can repeat what you tell them to do. They can sit down in the lab and put these things in a tube and put this here, and they might actually get really good results because they are good with their hands, but they don't really understand how they got from the beginning to the end or it's just kinda a black box in the middle. They are very, very bright and have all the skills, that is needed up to that point. But then they get stuck. They've gotten themselves to this point, but they lack the confidence to take that leap.
>
> Interviewer: So you think it is confidence?
>
> Botanist: Well, I don't know what it is, honestly. Um, that they can't just make the leap. I guess my example is you've got these specimens in front of you and you can see there are very clear differences, or these two different species. And they can give you all kinds of background information, but then they can't for the life of them, they can't do that final step. I would guess that's a confidence issue more than a competence issue. But is it always? I don't know."

The frustration of faculty across disciplines is borne out in a similar choice of words used to describe students who were unable to apply critical skills – "they cannot make the jump," "they get stuck," "lack the confidence to take that leap," "can't make that next step," "don't have that spark," "cannot make the connection." Yet, we also heard frustration among faculty when expressing their approach to help students who could not think critically:

> Interviewer: If I were to give you a student who had CT skills and you wanted to take them to this next level, what would you do to help them as a teacher or as a faculty member?
>
> Botanist: I think just work with them more to apply those skills. To make that decision of whatever they needed to do to make that leap. Just to build their confidence or build their self-esteem. But I don't know that this would always be effective. I don't know.

Faculty held that the level of CT in students is lower than they deemed appropriate for the undergraduate level. All faculty in this study were experienced teachers and understanding student thinking is integral to their work. Yet, the uncertainty that they expressed when attempting to articulate why students were not able to make critical application of disciplinary content raised many questions - did faculty really not know? If not, why not? Alternatively, did faculty know something that they were not ready to share with us? Or with themselves? Clearly, this phenomenon required further investigation.

A "Hopeful Pedagogy" to CT

The frustration that faculty expressed about the levels of CT in students led logically to questions relating to faculty efforts to address the issue in the classroom. Elements of what we are calling a "hopeful pedagogy" emerged when faculty were asked to reflect on the question - Do you think your current approach to develop CT in students is successful? The botanist responded: "It (CT) is *hopefully* learned and people improve…*hopefully* their critical thinking improves over time…a lot of courses are *hoping* students use critical thinking to appreciate the world." When asked about the outcome of his efforts with CT, a colleague from chemistry said, "our job is to teach them the knowledge that they need and *hopefully* they can take that and use it in critical thinking out in the real world." A faculty member from physics said, "I *hop*e they pick up these portions of CT and I think that is our goal, I don't know."

The "hopeful pedagogy" also became apparent in faculty approaches to CT in the humanities and social sciences. The studio artist said of his approaches, "Well, *hopefully* they've become wiser." The sociologist responded, "I *hope* that they are going away with that they need to critically assess everything that is put before them… Uh. I mean one would like to *hope* so." A colleague from psychology remarked - "It happens by some sort of osmosis…I mean, I would *hope* they would pick up some of it by osmosis." It became clear from the data that the "hopeful pedagogy" to CT was pervasive among faculty across disciplines. Given that this study was conducted at two universities with similar results, we became alert and curious about this "hopeful pedagogy" to CT.

Disentangling the "Hopeful Pedagogy"

If faculty hold that CT is an important pedagogical goal and institutions of higher education showcase CT in their mission statements but faculty at best claim hopefulness in the efficacy of their pedagogical efforts, there is a problem. While it is possible to frame the "hopeful pedagogy" into the deficit narrative surrounding higher education, we chose a constructive and strength-seeking stance (Lawrence-Lighfoot & Davis, 1997). We attempted to disentangle the "hopeful pedagogy" and explore its currents and undercurrents with the goal of providing actionable recommendations for faculty and institutions.

We found answers in (a) how faculty defined CT in disciplinary and non-disciplinary contexts; (b) a misalignment between how faculty approached CT in the classroom and how their institutions assessed CT; (c) a disconnect between faculty and their own approaches to CT, and (d) logistical and curricular issues within the GE program that placed constraints on the ability of faculty to adequately focus on CT. We found these reasons to have a bearing on the ways in which faculty voiced their own conceptions of what they know about CT and how they expressed confidence on whether their students were developing as critical thinkers.

Faculty approached CT as disciplinary and faceted

The data indicated that most faculty taught and assessed CT implicitly through disciplinary content and contexts. Individual faculty approaches to CT across disciplines can best be described as faceted. For instance, a botanist and economist said that they focused on CT as problem solving; a physicist said that CT was evident in making reasonable assumptions on statistical data; a philosopher said he focused on CT as the ability to use formal logic to establish validity and soundness in arguments. An artist said that CT involved examining multiple perspectives and exploring the past; a faculty colleague who taught languages said she focused on CT as the ability to mark distinctions and ask pertinent questions. A linguist argued that CT was the ability to classify information.

Further analysis of the facets on which faculty focused varied across disciplinary groupings and was grounded in disciplinary epistemology and methods (see Table 1). In fact, we found evidence that faculty focused on different facets of CT even within sub-disciplines in a field of study. The faceted approach is evident in the physicist's remarks, "I think we are in some subset of critical thinking that is commonly used in higher education. We certainly think we try to teach critical thinking…When we are teaching, we're teaching some subset." As disciplinary experts, faculty were most concerned with facets of CT that were applicable to their disciplinary content, methods and context.

TABLE 1. Key Elements of CT focused on in different disciplines

Natural Sciences	Philosophy	Humanities	Social Sciences
Problem solving Decision making Rational thinking Synthesis of knowledge Logical reasoning Making reasonable assumptions Testing hypotheses Statistical validity	Formal logic Validity and soundness Mathematical validity Questioning Marking distinctions Comprehend, articulate, analyze arguments	Questioning Considering multiple perspectives Exploring the past Qualifying or seeing difference Seeing nuances in opinion Marking distinctions Summarizing Wondering Multiple frames of mind	Problem Solving Decision making Testing hypotheses Inquisitiveness Statistical validity

Faculty approaches to CT were disconnected from institutional approaches

While we found that faculty focused on specific facets of CT depending on disciplinary content and context, their institutions assumed CT as discipline-general within curriculum and used standardized tests to assess CT at the institutional level. Faculty approaches across disciplines revealed that the expression of CT in different disciplinary contexts required essentially different skill sets. When taking a panoramic view across disciplines, faculty focused and assessed CT as multifaceted rather than using a uniform or generic conceptualization across the GE curriculum. When reporting on CT for VSA purposes, both institutions used discipline-general standardized tests. Yet, most of the faculty in this study had little knowledge of the instruments used at their institutions or that their students were being assessed for CT at the institutional level. There was a disconnect between faculty pedagogical approaches and institutional efforts to assess CT.

In addition, we did not find evidence that institutions had reached out to faculty to bridge the disconnect. None of the faculty in this study recollected having had any formal training at their institutions, specifically focused on CT. Most faculty were not aware of programmatic, college or university definitions or of institutional efforts to assess CT in students for accountability purposes. Their primary source of information on CT was gleaned from their own understanding or pedagogical experimentation. Consequently, the large scale discipline-general, institutional assessment of CT undertaken at both institutions was disconnected from the faceted, disciplinary approaches adopted by faculty in the classroom.

Faculty taught CT as a developmental process

Faculty in this study unanimously held that CT is a developmental process. Faculty who taught CT as a strictly cognitive process argued from a developmental stance that CT ranged in difficulty from simple-to-complex. The physicist said of his approach, "You start with simple models and show by example. I think that's the only practical way." The philosopher argued the skills of CT "build on each other." As a matter of pedagogy, he held "it is important to not hit them at first but try to get them engaged with some kind of content before we focus on the structural stuff…by the time they go into upper-level

courses or graduate courses or something, they get into all the messy details of exactly how to go about interpreting big texts rather than little pieces of complicated arguments."

Faculty from disciplines that focused on CT as the expansion of perspective and experience also pointed to the developmental nature of CT. The studio artist held that limited experience leads to limited critical capabilities. His pedagogical approach exposed students to diverse experiences with a progression toward complexity. When asked why CT was important in his discipline, he responded, "It forces the issue of looking to learn more because every time you expand and learn, the more liberated you are, the more skills you have, the more knowledge you have, the closer you're going to get to your own kind of work." His use of words like "expand" and "liberated" indicate that CT could progressively lead students to higher states of consciousness. The faceted approach, coupled with the developmental approach that faculty adopted when teaching CT, necessitated a further investigation into policies that govern the curriculum and GE program at the institutions we studied.

Curricular and systemic issues contributing to the "hopeful pedagogy"

The institutions at which this study was conducted offered the GE curriculum in a buffet style system in which students took courses that constitute the GE core, but with little guidance. In such a system, a senior in her graduating semester might be enrolled in the equivalent of English Composition I. It was not uncommon for students to attempt to take placement tests like the College Level Examination Program (CLEP) to opt out of taking English Composition I in their graduating semester. There were no requirements that ensured that students were being exposed to learning objectives like CT or writing in a sequence that led to a developmentally progressive exposure to the outcome. As a result, faculty unanimously reported in the focus group discussion that students often register for courses without taking foundational courses. One colleague asked, "What should I focus on, critical thinking or teaching them the basics they should have learned in a different course?" Clearly, the curriculum structure at these institutions was not conducive to providing faculty with knowledge of how students developed holistically as critical thinkers.

In addition, faculty identified other logistical issues like the large sizes of GE courses. A physicist said, "There are qualitative differences in the skill sets required to teach the large GE classes and just handle the mechanics of having 200 to 300 students in a class and handling supervising various graduate students or teaching assistants who are helping coordinate with that. It's a different skill set than having anywhere from five to 15 students in an upper division class or a graduate level class." Speaking about his success in teaching CT a chemist admitted, "in a big class section, not very well…I mean other than showing them the reasoning and hoping [emphasis added] that they will see the reasoning too." A philosopher argued that time and the size of GE classes was the reason he resorted to inadequate assessments of CT like quizzes and multiple-choice tests. The constraints that these logistical factors placed on faculty may have contributed to the hopefulness that they expressed about their approaches to CT.

Some faculty argued that the tenure of an academic quarter or semester is too short for an individual course or a single faculty member to adequately focus on the overall development of CT in students. In such a system, faculty reported they could not take credit for students' development of CT skills, nor could they be blamed for the lack thereof. Compounding this problem, was the fact that faculty who taught GE courses operated as islands with little curricular interaction or integration. Faculty reported not knowing the role their courses played in the larger GE curriculum or the learning objectives associated with their courses. A participant in the focus group discussion said that he had no idea which foundational courses his students had already taken or where they were going after taking his course. The lack of programmatic cohesion for both faculty and students poses serious problems for effective implementation of CT in the classroom.

Faculty were disconnected from their own approaches to CT

The effects of misaligned institutional and faculty approaches emerged strongly in how faculty expressed knowledge of what they know about CT. Some faculty appeared disconnected from their own approaches. When asked how they would assess CT explicitly in their courses, two faculty colleagues reported that they would resort to using the discipline-general CT rubric developed by their universities for GE. To recall, these faculty used a disciplinary and faceted approach to teach CT. When a studio artist was asked if this would do a disservice to his students by teaching facets of CT that aligned with disciplinary epistemology but assessing it as discipline general, he responded:

> Studio Artist: Well I think you would find if you were in attendance at these things that, um… that, um, you know, the discussions are pretty candid and, um, you know our hand is forced (italics for emphasis)really to have to make descriptions on scenarios of people. And critical thinking, I think, okay, critical thinking, I see that as something that happens when they're in the classroom working with the instructor. Where ideas are emerging and developing and when we're looking at these shows, they're talking to us about what they've done. And so in this set of rubrics here, basically they're explaining to us, we're saying the conceptual level, the work, how rich is that, where is that coming from in terms of what they're saying is in the work. We're talking about very specific work and we're not, at this level, at the end, I don't think we're looking at the beginning of where the critical thinking ability is. I think that's more in the classroom and this is at the end, the end work. So I see a difference there, because I wouldn't know at the end, unless I ask them specifically to take me through their whole process of, you know, from the very initiation of an idea and how they approached it.

When listening to this narrative with the Listening Guide perspective, we attended closely to the ways that this faculty member spoke in the "I voice" in order to hear how he spoke of himself relative to the questions we asked.

TABLE 2. Faculty member first person perspective.

I think I think I see I don't think I think I see I wouldn't know at the end If I didn't I ask them	you would find if you were in attendance you know you know you know	our hand is forced when we're looking we're saying we're talking we're not we're looking	they're in the classroom they're talking to us they've done they're explaining to us they're saying they approached it

In attending closely to the pronomic use in this paragraph, we hear in amplified sound this faculty member's thinking about how he stands vis-à-vis his colleagues, and his students. Reflecting about himself as an individual faculty member (as expressed through his "I voice") we hear an active, reflective and inquiring pedagogy with his, full of observation ("I see"), thinking ("I think") and questioning ("I ask"). In addition, we hear that he is also closely aligned with his colleagues as indicated by his frequent use of the "we" voice. This collective voice is in alignment with his I voice, replete with observational and active verbs. In turn, the students are active in explaining and talking about their approaches to their work. It is in this active form of pedagogy that he sees CT explained.

And yet, the institutional culture does not adequately reflect the kinds of knowledge that he and his colleagues value, nor is the assessment of CT done at the stage in the critical thinking process when CT is most evident in his disciplinary context. In an effort to comply, he resorted to using a rubric that assesses the technical skills - those that are easy to document on paper, rather than the complex messy process of thinking he attributed to his discipline.

While it might be tempting to critique faculty as being deficient in the assessment of their pedagogy, we wondered whether this perceived lack of definition was actually protection of their pedagogical space regarding CT in institutions that held monolithic views of CT in university-wide assessment practices. In other words, if faculty were forced to subscribe to the singular definition of CT (as defined by the assessment measures) then their pedagogy would be highly constrained. By not defining their assessment approaches, they did not stand openly in opposition to their institutions. Yet, the cost of such resistance led these faculty not to construct the tools they needed to gauge the efficacy of their pedagogical approaches.

DISCUSSION

Spotlighting the Disconnect between Faculty and Institutional Approaches to CT

The results of this study highlight the need to align the context of teaching, learning and assessment with regard to CT. However, there are challenges that need to be addressed. By listening closely to the tensions that faculty experience in meeting their own standards for CT while trying to align those standards to a set of institutional standards, there is a fundamental paradox. If faculty hold firm to their own understandings and teach accordingly, they risk being out of compliance with the institutions, which in turn poses professional risks. If faculty, however, conform to institutional standards rather than what they understand to be true, they risk disconnecting from their own knowledge, thereby jeopardizing their professional integrity and strength – a risk as well. Given that philosophical differences were found between faculty and institutional approaches to CT, is it possible that faculty lose hold of what they know about CT if their own assessment approaches holds no weight, and is ignored or disrespected? Does that contribute to their silence or to a disconnect from their own knowledge about CT and also from institutional approaches? These are questions for further research.

Need to Align Classroom, Institutional and Accountability Approaches to Assessing CT

The "hopeful pedagogy" brought to the forefront the serious implications of a misaligned system for student learning, faculty engagement, institutional improvement and accountability. The continued use of a misaligned approach to CT is problematic in that it does not provide faculty with usable results from the institutional assessment process and thereby no incentive to participate in forms of institutional assessment. Without institutional feedback on student learning that is aligned with faculty approaches, faculty can at best be hopeful about the overall outcome of their individual efforts with the curriculum. Neither can a misaligned approach produce valid results that are a fair indicator of faculty efforts in developing CT in students.

We argue that the effective implementation of CT through curriculum, pedagogy and assessment requires a complex and holistic approach. Complex, in that it embraces a multi-disciplinary approach to CT and the diversity of methods used by faculty in the classroom; holistic, in that it brings together and validates the individual efforts of faculty into a meaningful program for both faculty and students.

We recommend revisiting the application of a discipline-general model of assessing CT. Epistemologically, this study confirmed that faculty valued an understanding of CT that was faceted and grounded in their disciplines. We argue that any form of assessment of CT, whether conducted for institutional improvement or accountability, should consolidate and reflect the individual facets of CT that faculty teach in the classroom. The kinds of evidence used in institutional assessment should be work produced by students in the context of learning in the classroom. The assessment instrument or evaluation method should value the multidisciplinary nature of CT as evident in the various epistemological applications of CT.

Earlier research revealed that faculty rejected the results of standardized tests as valid measures of CT (Nicholas & Labig, 2013). Institutionally, Nicholas et. al. (2013) experimented with a successful faculty-driven, rubric-based, multidisciplinary model for assessing CT. They found that faculty were more engaged with assessment when using such approaches. However, when moving to a multi-institution assessment model, which is of interest to stakeholders like accreditors or government, the rubric-based, multidisciplinary, non-standardized model does not easily lend itself easily to reliability and comparability within and across institutions. There is an absence of large scale studies that establish the reliability and validity of non-standardized approaches to assess CT. The efforts of State Higher Education Executive Officers Association (SHEEO) and the American Association of Colleges and Universities (AAC&U), funded by the Gates Foundation, involving a Multiple State Collaborative (MSC) are early steps in this direction. This large scale pilot study which is currently underway, uses work produced in the classroom and trained faculty to apply a faculty developed rubric for CT (SHEEO, n.d.). The results of the MSC study will help examine questions of validity and reliability that plague the use of non-standardized methods to assess CT to facilitate cross-institutional comparison. There is need for more research using faculty driven, non-standardized alternatives to assessing CT within and across institutions.

Need for Curricular and Pedagogical Integration

The "hopeful pedagogy" also revealed a system that was disconnected in how CT came together for students through GE pedagogy, curriculum and assessment. We reason that the effective implementation of CT in the GE curriculum calls for a deliberate attempt to bring the curriculum together so that students are exposed to the multiple facets of CT and thereby the multidisciplinary nature of the concept. In addition, the developmental approach that faculty adopted to CT requires that students take GE courses in a developmentally

appropriate sequence (e.g. beginner, intermediate, advanced.) The lack of curricular integration or developmentally appropriate sequencing of GE courses does not set up students or faculty for success with developing important objectives like CT.

Writing on the content of the GE curriculum, Freehill (2012) wrote that it was "neither the rabbit salads of a nibble of this and a nibble of that nor is it isolated specialization." Yet, the structure of the GE programs at institutions in this study left it up to random chance that students would select GE courses to achieve a holistic or developmentally appropriate exposure to objectives like CT. The fact that the GE curriculum transcends individual disciplines, faculty or departments, accentuates the need for deliberate efforts to consolidate the curriculum at the program level.

We recommend that the GE curriculum for CT is brought together using curriculum maps (Sumsion & Goodfellow, 2004). Such maps should identify the course's learning objectives like CT, the facets of CT taught through course content, the developmental level in which CT is focused and the assessments faculty use to evaluate students' development in CT. Once consolidated at the program level, these curriculum maps can bring together multiple facets of CT through program integration, thereby providing a consolidation and valid reflection of individual faculty efforts across the GE curriculum. It is important that such maps are made available to GE curriculum committees, faculty, advisors and students. This will enable faculty, students and advisors to make informed decisions on course choice, content, and the sequence in which to take GE courses. It provides scope for cooperation and collaboration among faculty teaching GE courses and establishes an intentional curriculum around CT at the program level.

Need for Sustained Faculty Development in CT

This study confirmed previous research that faculty were teaching and assessing CT implicitly through disciplinary content (Halx & Reybold, 2005; Nicholas & Labig, 2013). We argue that the successful implementation of CT requires an explicit pedagogical approach. In addition, most research universities hire junior, adjunct or visiting faculty and local and international graduate students to teach GE courses. Socializing new and experienced faculty and teaching assistants into larger multidisciplinary, multifaceted discussions on CT is vital to making CT a meaningful outcome of general education programs.

Central to achieving this goal is an intentional approach to faculty development in the area of CT. However, when evaluating the effectiveness of faculty development models, Brent and Felder (2003) found that "most professional development programs in education have had a little effect on changing faculty teaching practices, with faculty typically regarding them as a waste of time." When examining the characteristics of successful faculty development programs, Centeno et al., (2006) and Adams (2009) identified the following: experiential, inquiry based, collaborative and involving peer and mentor feedback, sustained focus, interventions based on the scholarship of teaching and learning. Hence, we argue that a one time workshop on CT may not have deep impact on pedagogical and assessment practice of faculty.

A successful faculty development model for CT needs to be sustained, tied to concrete deliverables, and build faculty self-efficacy with regard to CT using mentorship and feedback models. From the findings of this study, we argue that it is necessary for faculty to first be exposed to theoretical understandings of CT - multiple ways of defining CT, the components of CT – skills and dispositions, multi-disciplinary and epistemological applications of CT. Faculty need to be trained in the developmental processes of CT, in identifying expert blind-spots in their pedagogy surrounding CT. The frustration that faculty expressed in identifying what was happening in thought processes of students who could not make the "leap" requires attention. Such training will help faculty develop holistic and multi-disciplinary perspectives on CT and help validate their own understanding and application of the term.

Second, faculty development needs to focus on high impact pedagogical practices like assignment design and the classroom assessment of CT. It should help faculty produce real artifacts like assignment prompts, rubrics or other methods for assessing CT. The goal should be to strengthen and develop faculty expertise in explicitly teaching and assessing CT in the classroom. Such approaches, we argue, will meaningfully impact both teacher practice and student learning with regard to CT. Further, most faculty at both institutions where the study was conducted were not aware of instruments or methods being used to assess CT for institutional or accountability purposes. Faculty development can be an important means to communicate and solicit faculty feedback on institutional goals and assessment methods. This will help bridge the misalignment in faculty and institutional approaches to CT.

Third, it is important that faculty development efforts respect and maintain the autonomy of individual faculty in the classroom. Faculty development in CT should emphasize the collaborative nature of the profession and the importance of working as a cohesive unit at the program and university level to deliver learning objectives like CT to students in meaningful ways. These approaches, we argue, can help make teaching and assessing of CT part of the fabric and rhythm of academic life and engage faculty meaningfully with the GE program and its assessment. There is clearly a need for further research into faculty development models relating to CT.

CONCLUSION

This study helped identify multiple underlying currents and cross-currents that are called into play at the institutional level when delivering complex learning objectives like CT to students through pedagogy, curriculum and assessment. As became evident, there is an overwhelming need to align the approaches used by faculty, with that of institutions and policy relating to CT. The continuation of a "hopeful pedagogy" or the alienation of faculty from discourses surrounding the curriculum and assessment of CT in GE undermines the immense potential of CT in undergraduate education.

If the deficit narrative triggered stakeholders to call on institutions of higher education and faculty to show the value we add in developing CT in students; a thoughtful response is required from both faculty and institutions. Such a response must be grounded in the scholarship of teaching and learning – reflective of the integrity and strength of our practice as teachers and institutions of higher education. Being able to answer questions about student learning is central to the practice of teaching and learning. We need to move from a "hopeful pedagogy" to validating that hope with evidence of student learning. Such validation will not only satisfy the requirements for accountability but more importantly, establish the integrity and strength of our practice as teachers and institutions of higher education.

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