The goal of the Critical Think Tank CT² project is to advance the critical thinking and clinical reasoning of our students. We propose to do this by giving faculty and students the tools to reflect on and develop critical thinking and clinical reasoning skills.

Faculty, staff and students participating in the QEP Retreat in May 2015 concluded that one of the areas in which our students are not being adequately prepared is in the ability to think critically about problems and find solutions based on evidence. It was the consensus, that many of our students at the Health Science Center are not currently being challenged enough to develop critical thinking skills that lead to effective clinical/research reasoning, and, even if they have these skills, they may not have time to practice applying them in the face of the sheer volume of information they are being expected to memorize.

The Need for Critical Think Tank CT²

If our students are not adequately prepared to think and reason critically, they are not likely to become fully competent healthcare professionals who can recognize, interpret and effectively respond to unexpected variations in their clinical practice or research. There are several reasons why we think that students at the Health Science Center could benefit from more preparation in critical thinking and reasoning skills.

In a spring 2015 faculty survey, faculty were asked about whether or not they agreed that each of 18 skills were adequately provided to students. Several skills commonly related to critical thinking (such as research, interpreting data, engaging in evidence-based practice, and solving problems in their profession) ranked in the bottom 55% of the topics presented to them, with fewer than 85% of faculty agreeing that students are being adequately prepared in these areas. Preparation in research skills ranked last with only 63 percent of faculty agreeing students are being adequately prepared in this area.

Students have also expressed concern that they are not as well prepared in critical thinking and clinical reasoning as they would like to be. Students in focus groups held in spring 2015 expressed these concerns. One student said:

“...the curriculum does a poor job [of teaching critical thinking]...When you get to the third year there are all these pieces that need to be connected.”

Other students suggested their program should give students more cases, and more opportunities to research and give presentations on topics. Students also said they find the Critically Appraised Topics (CATs) program in the School of Dentistry and the synthesis cases in Medicine to be useful in developing their critical thinking.

In a spring 2016 student survey, the vast majority of Health Science Center students (97 percent or more) agreed that it is important for them as a professional to be able to:

- Reason through complex solutions to complex problems;
• Be aware of the consequences of the decisions they make based on information;
• Clearly communicate proposed solutions to problems;
• Apply solutions to clinical care; and,
• Recognize errors in their assumptions or logic.

However, a smaller percent (77 to 85 percent) of the same students believe they are adequately trained in these areas.

**Critical Think Tank CT² Alignment with the Mission and Strategic Vision of the Health Science Center**

Fostering a love of inquiry in our students is the responsibility of education in a free society. The Health Science Center recognizes the need to teach inquiry as a life-long skill in its 2013-2017 strategic plan for education by identifying the importance of:

*emphasizing active, engaged, self-directed and contextual learning that promotes continuous development of lifelong learning skills.*

While inquiry-based learning and critical thinking are not specifically mentioned in the 2013-2017 strategic plans of the schools, it is implied as a component of the programs goals to foster innovation and better meet workforce demands. Critical thinking skills also are frequently cited as desirable learning outcomes in program assessment reports. The following learning outcomes are being used as measures of student success in multiple programs across the Health Science Center.

- Evidence Based Practice – 22 programs
- Evaluating Literature – 11 programs
- Evaluating Health Care Practices – 10 programs
- Critical Thinking/Problem Solving – 2 programs

**The Critical Think Tank CT² Proposal**

Critical thinking is an important skill required for all of our students at the Health Science Center. As they enter their professional roles they will need to be able to analyze and interpret information and make critical judgements in the clinic, the classroom, boardroom and laboratory. While engaging students in inquiry is important to a health professions/graduate science curriculum overall, some courses and learning outcomes within courses will be more appropriate for teaching critical thinking skills than others.

**Phase one:** Course directors from each program will be recruited to develop and implement intermittent experiential capstone project/activities in their program that will challenge students to engage in critical thinking and reasoning. These activities can range from projects to case studies, and are best if they are school/program specific, targeted toward material just covered, the same for all students in a given cohort, and integrated into a program’s curriculum each semester.

**Phase two:** As the capstone projects are entering the implementation phase, an orientation to critical thinking will be developed and delivered to all students as they enter their program. It will orient them to the Health Science Center’s definition of critical thinking and reasoning, why it will be important to them as a professional, and what the expectations will be for them in their capstone projects.
Phase three: The final phase of the **Critical Think Tank CT²** initiative will be to engage faculty, who request it, with the infusion of critical thinking activities in their courses. Annually, ten faculty will be given the opportunity to engage in enrichment activities such as workshops with external experts via a grant. Through these workshops they will be supported in the identification of specific subject matter that is open for debate, ambiguous, and/or contested in the field and then provided with ideas and support for activities that will help students to foster their critical thinking and reasoning skills. In addition, ten faculty will be selected and honored with awards for their efforts in enhancing critical thinking in their courses.

**Critical Think Tank CT² Student Learning Outcomes**

If the Critical Think Tank CT² project is successful, our students will develop inquiring minds that are better able to solve tomorrow’s complex problems. Our students will become professionals who are able to recognize, interpret and respond effectively to unexpected variations they encounter in patient care or research.

If the **Critical Think Tank CT²** project is successful, by 2023 our students will be better able to demonstrate their ability to:

- Identify problems;
- Synthesize information from a variety of sources;
- Develop solutions based on scholarly evaluation of the evidence;
- Communicate proposed solutions;
- Apply solutions to educational activities, clinical care and research; and,
- Evaluate and reflect on the process of problem solving.

**Resource Estimate for Critical Think Tank CT²**

The CT² initiative will involve the development of a Critical Thinking Skills Center focused on faculty enrichment activities and curricular development promoting critical thinking and reasoning skills. The CT² Center would have an operating budget and be led by a person at the director level or above, with at least one administrative staff member. One or two new staff, working collaboratively with existing Health Science Center staff, at the project coordinator/educational development specialist level, will be responsible for directly assisting faculty to incorporate critical thinking into the various program curricula.

In addition, there would be two groups of faculty involved in the development and implementation. First, a group of approximately 10 faculty fellows would be recruited and approximately 10 percent of their time would be bought-out by the project. In year one they will develop the program level capstone projects. In years two through five this same group would be involved in an assessment and review process to measure the impact of the capstone projects on student’s critical thinking.

In the second or third year of implementation, faculty would be given the opportunity to apply for one of 10 Critical Thinking Enhancement awards. Faculty will apply for this award by submitting a written proposal detailing how they promote critical thinking in their courses and provide data on the impact of their efforts on student learning. Award winning faculty would be expected to present on their efforts and its impact on student’s critical thinking skills at an end-of-the-year symposium.
Assessment of Critical Think Tank CT²

The assessment of the Critical Think Tank CT² initiative will be designed to collect both formative and summative data. All services, events and course offerings (full courses and modules) will be evaluated to collect data to help us identify strengths and weaknesses and improve these activities.

In addition, the overall impact of the Critical Think Tank CT² initiative will be measured using both indirect and direct measures.

Indirect measures:

1. Surveys about critical thinking in the curriculum before and after implementation: Students, faculty, employers.
2. Syllabus review before and after implementation.
3. Classroom observations before and after implementation.

Direct measures:

1. Assessments of specific critical thinking skills embedded in select courses.
2. Analysis of course assessment artifacts by a group of select faculty of the quality of critical thinking skills using a nationally validated rubric. This would be a responsibility of the 10 faculty fellows employed at 10 FTE by the Critical Thinking Skills Center.

Available Local Expertise and Resources

There are a number of existing resources and individuals with expertise with which the Critical Thinking Center will be able to draw support for the development and implementation of this project.

1. Education development specialists located in the schools
2. Education development specialists in the VITaL Center (formerly Office of Online and Blended Learning)
3. The Critically Appraised Topics (CATs) program in the Dental School
4. The HEB Clinical Skills Center
5. The School of Nursing Simulation Center