

TEACHING EFFECTIVENESS INITIATIVE POST IMPLEMENTATION REFLECTION FORM



Share the impact of your professional development by reflecting on the experience, how it changed your teaching, how it changed your thinking, and how it impacted your students. Use the [TEI Reflection Rubric](#) on page 3 as a guide to complete this form. Please complete all sections prior to [uploading form to Bridge/MyLearning](#).

FACULTY INFORMATION

- Name: **Exemplar for Curriculum/Curricular Alignment**
- Email:
- Department:

PROFESSIONAL DEVELOPMENT EXPERIENCE

- Name of Experience: **BPIT Course: Critical Thinking**
- Provider: **TILT**
- Date(s) of Experience: **Spring 2022**
- Description and Outcomes of Professional Development Experience:
A Three-week Canvas-based course on promoting student critical thinking through intentional course design. Course outcomes included the ability to answer several questions:
 - What is your definition of critical thinking? What does it look like in your course or field of study?
 - How well does the level of critical thinking students practice in your class align with the level of thinking required for your summative assessments?
 - Which activities and formative assessments best help students practice critical thinking needed to master essential concepts for your course?
 - How can you capitalize on your students' existing critical thinking skills and assist them in transferring those skills to your course?
 - What types of formative assessments do you use throughout your course to give feedback to students on their ability to think critically?
 - How can you reframe course outcomes to tap into students' natural curiosity and motivate them to think critically?

I have applied lessons learned here in two different course design efforts:

(1) I redeveloped our [Course Name] course, which is intended for [Discipline] majors or those double majoring in [Discipline]. The redesign shifted emphasis away from a few high-stakes exams over lecture-based material toward many low-stakes quizzes and more application-oriented "lab" assignments that involve much more formative assessment and exploration;

(2) I am in the (lengthy) process of redesigning the [course] curriculum, following backwards design, and framing learning outcomes as questions to pique curiosity.

TEACHING EFFECTIVENESS DOMAIN

Inclusive Pedagogy, Curriculum/Curricular Alignment, Classroom Climate, Pedagogical Content Knowledge, Student Motivation, Feedback & Assessment, Instructional Strategies

- Primary Domain (see [TEI Pre-approved PD list](#) for CSU-related events): **Curriculum/Curricular Alignment**
- Secondary Domain (if applicable): **Feedback and Assessment**

USE OF RESEARCH-BASED PRACTICES

1. Describe the specific research-based practices (from the TEF) implemented in your teaching related to participating in this professional development. These changes might be new additions, or they may be extending or revising an approach you've been using. Please be specific.

In the [Course Name] course:

Critical thinking and [discipline] thinking share many attributes - both involve examining statements or arguments, translating them into precise statements that can be assembled into a logical structure, and then working to synthesize new information or knowledge from what is known and some "axioms" and processes of deductive reasoning. In a sense, [discipline] instruction is "automatically" teaching a narrow form of critical thinking. But students still struggle to see the connection between some number or expression that comes out of a [discipline] process and a real-world quantity or process, and are often unable to answer the question "Is your answer reasonable?" or "What does it tell you?". The context gets lost in the mechanical process and rules-following, and context is key to critically thinking about a result.

When I took on the [Course Name] course, it was taught in a very traditional way. 5 weeks of dense lecture, with homework sets for practice, a high-stakes midterm exam, and then repeat that sequence twice more, with an even higher-stakes final exam at the end.

An instructor can try to make contextual connections to real-world scenarios in a lecture, but the problems are long and difficult, and contextual setup at the start of the process is quickly lost as we walk through all the machinery and try not to make [discipline] blunders. When you try, at the end, to bring things back into context, all connection between what we just did [discipline] and the real world seems very tenuous and "unreal", so it's hard to critically assess what's happened.

To try to address this, I converted the course to a new format, where the high-stakes exams were replaced by weekly in-class quizzes (much lower stakes), and added group-oriented lab assignments with students working in teams. The lab assignments were contextual and engaging. For example, in the second lab assignment in the course, the first part of the assignment asks students to guess how the answer to a problem will look without doing any [discipline]! Then they would do some [discipline], and go back to see how well their intuition matched the computed answer. The context was a skydiver performing a jump from a plane, and opening the parachute after some time in free-fall. Students were asked to, intuitively, sketch graphs of the skydiver's height, velocity, and acceleration over the course of the dive - they drew these in groups on the boards around the room, talking among themselves until they were satisfied, then the groups looked around the room at the (very different) results from other groups, and had some time to explain their reasoning and thinking and discuss. This gave every group a window into the other group's thinking processes and highlighted how seemingly reasonable thinking can produce wildly different outcomes (chances are, all groups' graphs are somewhat incorrect - this is a very hard exercise to do!) But after this, they were all very interested in diving into the [discipline] to see whether their reasoning was vindicated or not, and were very engaged in the critical interpretation of their [discipline] results. The other labs are similarly designed (but this one is the best, I think, at promoting critical thinking).

In the [Course Name] Course redesign:

This is a smaller change, but maybe impactful. One of the best practices described in the course is the framing of learning objectives in the form of questions to engage students' natural curiosity and problem-solving skills in a subtle way.

Learning outcomes traditionally are written as phrases (starting with a measurable verb from Bloom's) that can follow "Upon the completion of this course, I will be able to...". For example, "convert a number between fraction and decimal representations."

In my courses, I identify a high-level learning outcome, which I can state in "Bloom's" language, and then associate with that outcome several "key questions" and also a number of "exploration" topics that I want students to engage with. Here's an example from [Course Name]:

I can interpret quantities and units of measure in various forms, convert quantities between compatible units of measure or numeric representations, and perform rounding correctly.

Specifically, I am confident answering **key questions** like the following: (these are assessed for mastery)

- What do quantities described in words or pictures represent; how could I describe a quantity using words or drawings?
- What are the quantities relevant to a situation, which are constant, and which are variable?
- How do I convert a quantity from a representation in one unit of measure to a different, but compatible, unit of measure?
- Given a number in some representation, including fractions, decimal approximations, and scientific notation, what are other ways to represent that number?
- How do I round decimal numbers to a specified number of digits after the decimal point?

In addition, I have **explored** questions like the following:

- How can non-numerical data, like opinions or preferences, be quantized?
- What does delta notation mean, and how do I use it to communicate changes in quantity?
- Is a given unit of measure fundamental or derived?
- What do the metric prefixes mean and how can I convert quantities between different metric units?
- How can units help me determine if an answer is reasonable or not?

The key questions drive the design of formative assessment questions to build *proficiency*. The questions and exploration topics invite context-specific examples and applications that try to connect the learning outcome to the student's lived experience.

This effort is ongoing, but I'm very happy with this way of framing learning outcomes (and communicating them to students) - it makes it quite clear what a particular item is trying to assess, and makes it easy for me to see how well my assessment is aligning with (and covering) the objective.

2. How do these changes align with the [Teaching Effectiveness Framework](#) (TEF) domain(s) you are addressing in this reflection?

The work in the [Course Name] course aligns with the "Curriculum and Curricular Alignment" domain in these ways:

- **Inclusive Curriculum:** Breaking up lecture content with lab-oriented assignments (often using technology or visualization tools) increases the variety of course materials and types of assignments. I do not yet have good examples of work by scholars in minoritized groups.
- **Course Alignment:** Assessing student learning using 14 quizzes and 14 lab assignments gives me much more frequent feedback on student learning (fast enough to go back and address things that caused trouble on a quiz), and the ability to assess more of the course learning outcomes and at finer granularity. The frequent assessment also motivates students to study without exams feeling overwhelming. I am explicit in class about what learning outcomes will be assessed on each quiz and how course content connects with those outcomes.

It aligns with the "Feedback and Assessment" domain in these ways:

- Summative assessments have become more frequent, and more varied (quizzes over analytical work, and lab assessments covering applications and contexts). Attempts have been made to make assignments that connect with real-world contexts rather than purely abstract problems to solve.
- The quiz and lab model allows students to be assessed and receive feedback much earlier in the course (first four weeks), giving them a better sense of how they are doing.

The work in [Course Name] aligns with the "Curriculum and Curricular Alignment" domain in these ways:

- **Learning Outcomes:** The learning outcomes for each module in the course were articulated through a three-step process: First, a high level "understanding goal" was stated (not in measurable Bloom's language) to guide the creation of objectives. Second, the learning objectives (in Bloom's language) were developed as "I can ..." statements beginning with a measurable verb. These were divided into key objectives that students would be assessed on for course mastery, and more supplemental "exploration" objectives that students could engage with as interested. Finally, these objectives were reframed as "key questions" and "explorations" (also phrased as questions) to invoke students' natural curiosity.
- **Course Alignment:** Framing learning outcomes as in both Bloom's language and as questions makes it very easy to create formative and summative assessment items (backwards design) and to directly connect them to class materials. Each grouping of content in the course explicitly states the key questions students should be able to answer after completing the material, and assessment items are directly derived from these questions.

IMPACT ON STUDENTS

1. How did students respond to these changes? (*Participation, quality of work, other aspects? Was there an immediate effect, or did the changes take place over time?*)

The changes in the [Course Name] course were immediate - the success rate increased (DFW before I took on the course was 30.8%, and has averaged 15% since the changes were made in Spring 2022). The lower-stakes and more frequent assessment kept students engaged and the weekly quizzes broke up the stretches of lecture.

Students seemed happy with the change - they shared that it was much less stressful to have the weekly quizzes than a few high-stakes midterms.

They also shared that they enjoyed the labs as seeing some real-world applications rather than just theory.

2. What evidence do you have that this change impacted the majority of your students? (*Description and/or data on observed impacts on attendance, performance, engagement, etc.*)

Participation in the lab assignments, which was done in groups, was much more engaged than passively listening to lecture - all students had much more opportunity to interact with each other and with the instructor, and the new format made the regular lecture class sessions more interactive and engaged because students were more comfortable after having worked together in the lab setting.

My perception is that the overall stress level in the class is lower, but I definitely did not reduce or "soften" the material in the process - I think students are learning with just as much (or more) rigor than they were in the old lecture model.

IMPACT ON FUTURE TEACHING

1. Based on how students responded, will you keep or continue with these changes, make additional changes or do you feel the need to go in a different direction? How did it go? What worked? What didn't? What would you do differently? What will you keep? Describe your next steps.

I do not plan to ever revert to a "midterm-final" model of summative assessment, unless I'm teaching a coordinated course and the coordinator requires that format. The frequency of assessment and feedback, and the stress-reduction of low-stakes assessments is well worth the extra work creating and grading those assessments.

I am also encouraged by the results of adding more contextualized and "authentic" problems to a fairly theoretical course - I will definitely try to keep this practice in my future courses.

A future goal I have (if I'm ever in a position to try this out) would be to look at the [course] sequence, and try to convert that course to a similar format, where one day each week is a "lab" session with application problems. Since several different majors take this course, it would be amazing to have different lab assignments for sections or students in different majors, to connect the [course] concepts to their program of study - relevance and perceived usefulness and applicability should help with motivation and thinking of the material in context. Having real world rather than abstract settings for problems should help them think critically about their results.

From the [Course Name] course redesign, I like the exercise of framing learning outcomes in the form of questions, and taking the time to articulate the objectives as "key" or "supplemental" as a guide to creating

assessment questions.

My next steps will be to make these techniques part of my standard practice when building new courses. I may be assisting with the construction of [Course Name] in the Spring, and will apply these tools in that course. I will also be working to update our CSU Online course offerings, and will certainly apply these techniques in any modifications I make in those courses.

2. What recommendations would you make to colleagues based on what you've learned?

Take the time to think about the course and module learning objectives carefully - make sure they are well aligned to the goals of the course and what will be needed in future courses and in students' lives. That time will be rewarded with a more authentic course that students will engage with and see as relevant.

Having authentic and context-based objectives, in turn, makes it easier to create authentic and context-based activities and assessments.

FEEDBACK FOR TILT

- What recommendations do you have for TILT?

I really appreciate having the TEF as a guide. Pedagogy is a huge and sometimes overwhelming field, and instructors don't have a lot of spare time to do the legwork of gathering these resources and organizing them. TILT's work is invaluable - keep up the great work!

REFLECTION RUBRIC FOR TEI EXPERIENCE

Participants must earn “Accomplished” in each criterion to earn domain experience units (DEU’s). “Developing” reflections will be returned with specific feedback for revision.

NOTE: The depth and/or breadth of your response should be in line with the length and intensity of the professional development experience. For example, an instructor taking a 1 DEU course might implement one new practice whereas an instructor taking a five DEU course might implement multiple practices or an in-depth revision to a course.

<i>Criteria</i>	<i>Accomplished</i>	<i>Developing</i>
Implementation of Research-based Practices Describe the specific research-based practices (from the TEF) implemented in your teaching related to participating in this professional development. These changes might be new additions, or they may be extending or revising an approach you've been using. Please be specific.	- Describes the teaching or planning technique in enough detail so that the reader knows exactly which technique(s) was implemented. - Depth and breadth of implementation of new teaching practices is congruent with the length and intensity of professional development experience.	- Briefly describes the teaching or planning technique(s) implemented. - Needs more detail to be clear to the reader.
Impact on Students Describe how these specific research-based techniques impacted your students and/or class. Describe how students responded to these techniques.	- Addresses what worked well and what didn't work as well openly and objectively. - Gives specific details as to how most students responded to the implemented technique.	Begins to discuss the impact on class or students but needs more detailed analysis of what went well or not well regarding student response to the implemented technique.
Impact on Future Teaching - Describe how these changes have impacted your beliefs related to learning & teaching? - Describe how these changes/results will impact your future teaching AND/OR your next annual goal? What are your next steps and when do you plan to make these changes?	- Indicates through word choice and next steps a genuine effort to develop teaching using research-based practices. - Includes specific and time-bound plans for future implementation.	- Includes general next steps that may or may not be connected to recommendations in the experience. - Does not indicate through word choice or next steps a genuine effort to develop teaching. - Does not include specific nor time-bound next steps.