Semester Long Assignment
Option A: Intervention Tutorial – Addressing Student Difficulties

Participant Requirements: Group or individual

Purpose: A purpose of this assignment is for you to apply principles from your readings and your results from your findings/observations about students’ ideas/difficulties to an instructional intervention that can help students work through their difficulties. The product of this assignment will be a tutorial session, a recitation activity (or sequence of activities), an online tutorial, a YouTube video, Screencast or some other media that:

1. Addresses students directly
2. Explicitly describes the difficulty that students tend to have with a particular concept or idea in a course (see examples below)
3. Explicitly states the goals of the activity
4. Provides a sequence questions/experiments/data analysis that guides students through the activity leading to a better understanding
5. Provides an assessment of student understanding at beginning and end of tutorial to estimate progress students have made in their thinking
6. Draws on data from interviews that investigate students’ ideas (if available)

Some examples of difficulties that students have in various courses are shown below:

CALC: setting the limits of integration in Calculus III
CALC: visualizing Riemann Sums and applying them to their own field of study
EBIO: distinguishing between allopatric and sympatric speciation
PHYS Intro: transferring ideas about Newton’s Second Law to vertical or rotational motion,
PHYS Upper Division: the link between Gauss’ Law and the Divergence Theorem,
MCDB: conceptually differentiating between transcription and translation when studying RNA and DNA
ATOC: reading soundings and predicting storms
MCDB Genetics: Conceptually viewing a double crossover as two consecutive single crossovers rather than as two different processes
CHEM: Conceptually understanding the titration curve of a buffer/non-buffer
GEOL: How to apply Facies, Depositional Environments, Walther’s Law in various geological settings
ASTR: Distinguishing between daily motions of the Moon from its monthly motions and explaining the differences between phases and eclipses

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Timeline and Due Dates: This semester-long assignment requires multiple stages of feedback and revision. Here are the major due dates and weeks that you will consult with your LA course instructor:

- Week 3: Part I Project DUE: Project decisions; concept focus; project timeline
- Week 5: Part II Project DUE: Initial collection & analysis plans
- Week 7: Part II.5 Project DUE: Revised collection & analysis plans
- Week 10: Part III Project DUE: Data w/ initial analysis
- Week 14: Part IV Project DUE: Poster, written report and online template

Documenting the Process: Your documentation begins with information about the course and your views about what student difficulty you have noticed and are addressing with this tutorial. You will then complete your tutorial throughout the semester individually or with your group, with the help of your lead instructor, and with your mentor in the consultation sessions.

Meeting with Lead Instructor: You must meet with your lead instructor of your LA-supported course throughout your tutorial design process. You may wish to meet with your lead instructor early on to discuss the difficulty you have noticed and to share ideas about how you might address it.

Consultation Meetings: You will have two consultation meetings with a mentor (one of the instructors of your pedagogy course). Each individual or group will sign up for a 10-20 min consultation session that will take place during class time (and other scheduled times). During the meeting you will discuss and develop your ideas.

Preparation for Consultations: You must complete each section of the online template by the day each section is due. Your mentor will read through this and assign a grade according to the rubric. Your mentor will also use what you reported in the template to plan for the consultation. The more you report, the more you can get out of your consultation sessions. During your consultation session, your mentor will work with you or your group to help you articulate and refine your ideas, and turn them into a tutorial that can be implemented in a real classroom environment.

Other things to consider: Your tutorial should pay specific attention to the concepts and learning theory we discuss in class. For example, building on student conceptions, incorporating metacognitive and argumentation, differentiation, learning cycles, formative assessment, the nature of science, the nature of math, and the nature of engineering.

Final Product: Your group will develop a poster that discusses your activity. This will include:
- Title, group members, university, department(s), courses, date
- Brief description of the concept area of interest and your motivation for doing this work
• Brief description of your goals for students
• Discussion of your activity that includes ways in which readings / concepts from the LA course inform your decisions
• Synopsis of course materials, such as lesson plans, handouts, implementation notes

In addition, your group will also write up a complementary complete activity guide that shares your activity for use of future educators (instructors, LAs, TAs etc.). This will include:
• Concise (<500 words) abstract describing project and key goals(s).
• Step-by-step lesson plan (what the teacher does, what the students do, and why)
• Materials for your activity, in the form of slides, handouts, videos, etc. (in-line or links)
• Implementation notes for instructors (how would it be different with 20 students vs 5?, etc)
• Full APA citations of all sources (see here and here for the basics)