COAS Peer Observation of Teaching Form

Faculty Name: Darryl Chamberlain
Observer Name & Title: Zackery Reed, Assistant Professor
Course: MATH 111 – Precalculus for Aviation
Course Term: October 2022

PRE-OBSERVATION

Context or Background Information and Faculty Focus Requested (to be filled out by faculty member to be observed):
This course was my first EagleVision course. I would appreciate you reviewing the specific lessons and activities unique to EagleVision synchronous class time.

POST-OBSERVATION

Observer will: Discuss strengths and areas for enhancement and improvement (to be written by Peer Observer). This discussion may include items such as engagement with students, quality feedback, and demonstration of subject matter expertise.

I have observed the planned and implemented activities for Dr. Chamberlain's EV synchronous lessons. Dr. Chamberlain demonstrates a productive balance of direct instruction (i.e., lecture) and active learning activities. This suggests an intentional awareness of student attention span needs, and more importantly an implementation of currently known best practices for mathematics pedagogy.

Each week (except for the final week), Dr. Chamberlain engaged the students in active-learning group tasks. In these group activities, Dr. Chamberlain implemented a diverse collection of tasks that each promoted productive student engagement, reflection, and development of valued mathematical ways of thinking. Often, the groups would be tasked with presenting the results of the group activity, with each member of the group responsible for a different aspect of the presentation. This demonstrates awareness of classroom management, as Dr. Chamberlain structured these activities in a way to promote and incentivize student engagement.

More specifically, Dr. Chamberlain targeted particularly important mathematical practices and ways of thinking in these activities, such as generalization, attention to detail, and quantitative and covariational reasoning. For instance, Dr. Chamberlain promoted generalization in Weeks 1, 2, 3, 6 and 8 explicitly in the activities, such as the Week 2 group activity of solving *any* triangle problem using particular trig identities.

Dr. Chamberlain promoted quantitative and covariational reasoning in Week 8 by asking students to compare models of dog versus human aging. The models incorporated various formulas used throughout the course, and to appropriately analyze the fit of the models to the lifespan of a dog, students needed to attend to local variations in the models as well as end-behavior. Most importantly, the students needed to attribute measurable attributes to the parameters within the models (i.e., engage in quantitative reasoning), a key step in applying mathematics to approximate real world phenomena.

This relates to another key feature of Dr. Chamberlain's tasks, periodic glimpses at tangible and real-world application of the mathematics. Particularly important applications of these activities were to the physics and technology involved in flight. Dr. Chamberlain engaged students in analysis of an article about crosswind, analyzing the use of various functions as sensitivity weights in flight controls, and modeling flight through constructing systems of equations involving drag, thrust, weight, and lift. These high-impact activities serve to both engage and equip the students in his class.

Implementing synchronous activities from a pre-made template is a nontrivial teaching task, and Dr. Chamberlain excelled at this. The primary area of improvement that I might point to involves a challenge faced with any synchronous instructor, particularly in instances where students are not accustomed to classroom norms of engagement, activity, and reflection. My perception of the normative practice of synchronous classes is that they primarily entail lecture, a pedagogy that is demonstrably limited in effectiveness. Dr. Chamberlain should thus be applauded for engaging students in more evidence-based practices, and for the incentives for engagement that he built into his class activities. It can be challenging, however, breaking students out of traditional mold of instruction. While Dr. Chamberlain saw much success promoting student engagement in the activities, I was still aware of challenges faced promoting and maintaining the new classroom norm of engaged learning. Particularly in early weeks, this was a challenge for Dr. Chamberlain, however this is to be expected amidst a need to change student expectations and establish classroom norms. I would encourage Dr. Chamberlain to continue discovering new ways to establish and maintain these norms, as is the struggle of most instructors who implement active learning initiatives.

Week 1: write pseudocode to graph a line for *any* linear function. First work in groups, then groups present. (generalization).
Next group activity is to have the groups create (and then report on) a summary of covered course topics. (Promoting student reflection through presentation mini-projects, directly relating to material).

Also breaks down like, the roles of the students in the presentations.

Week 2: Write the steps to solve any triangle problem using a trig identity assigned to each group. Then report.
Then group activity part 1 – *create* system of equation questions for the other groups to solve based on secret conditions (i.e. "solution is a pair of rational values"). Part 2, solve other groups' problems

Week 3: Write general steps to factoring trinomial under a given technique. Report.
Learn partial fraction decomp, report.

Week 4: Brought in like, actual flight theory (lift/drag/mass/etc) and had them construct two systems of equations questions to make a plane fly based on lift vs weight and thrust vs drag, made pseudo competition. Report.

Week 5: Create a mind map for constructing a line. Then explain a problem from the homework and describe the problem *type*.

Week 6: Summarize word problem from homework (with general steps). Read and reflect on crosswind article (again, another flight application). Then General steps to solving any triangle and deciding whether to use law of sines or cosines.

Week 8: Groups compare models of dog ages, which seems more realistic, etc. Then discuss the impact of different functions implemented in RC flying, specifically the sensitivity of controls.

FACULTY REFLECTION (1 page)

I thank Dr. Reed for his thorough and insightful review of my first EagleVision course. As he noted, implementing active learning in the unique EV course structure presents additional challenges to an already difficult learning style. It is great to know the general approach and implementation were effective from an external instructor's perspective, especially one who's research focuses on collegiate mathematics education.

As Dr. Reed noted, I will continue to work on setting student expectations early in the term as most EagleVision courses predominantly lecture during the in-person portions of the course. One approach would be to make more frequent announcements within Canvas to set expectations on a daily level rather than at the entire course level as I did in this course.