Statement of Teaching Philosophy

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Since high school, I have liked discussing STEM subjects such as math, physics and chemistry. I enjoyed helping my friends when they did not understand. I grew up in a family where teaching was celebrated because most of my aunts were teachers, making teaching feel natural and exciting. It was not until graduate school that I realized the importance of teaching math meaningfully. When I teach a course, I set objectives so that I can be effective. While each course requires its own unique set of objectives, the recurrent objectives I set for my students are to:

1. Advance critical thinking skills
2. Communicate mathematical ideas
3. Develop proactive learning

Most of the strategies I used to achieve my objectives came from the guidance of my mentors and course coordinators in the Department of Mathematics at the University of Utah. Particularly to Professor Noonan-Heale, from whom I have learned a great deal while teaching Business Algebra.

Critical thinking

During lectures, I use a few strategies to develop critical thinking in my students. Critical thinking is a skill that will be beneficial in the class and transferable to life. For example, when teaching linear equations, I ask my students to brainstorm as many problems as possible where they are given two pieces of information and asked to find a line. This activity allows students to recognize fundamental mathematical concepts even when the problem statement changes. Another way I like to expand critical thinking skills is to link mathematical ideas to applications. For instance, when teaching systems of linear equations, we can let the intersection point of two lines be the equilibrium point of the supply and demand equations – this transforms the concept into a business problem. From the literature, I like to use a tool called **Bloom's taxonomy**[1]. This is a classification into levels of complexity of math problems, specifically the top levels **evaluating** and **creating** are beneficial because they encourage critical thinking. I develop various activities for my students. For example, suppose I ask a question in a lecture where I am teaching graph transformations. I will provide the students with the graph of a parabola that opens up/down, it was translated in the plane and it has some stretching. Then, I ask them to describe which transformations were used when it is compared to $y = x^2$ and write the expression that represents the graph. This is an example of a problem in the **evaluating** category. They are evaluating which transformations are affecting $y = x^2$ as a means to produce the picture in question. Another example is to give students

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[1] *Lesson Planning using Bloom's Taxonomy in my Math Classroom*, Shalini Chauhan. July 2020

the formula for a future annuity with all the values substituted to represent a problem setup; I ask them to create a situation where they would use this formula and the data. This makes them go beyond remembering a formula and substituting data in it. It provides an opportunity to **create** something new.

Communicating mathematical ideas

I like to cultivate in my students the skill to communicate mathematical ideas. When they are learning a new topic, it is common that this is new and difficult. Having mathematical discussions is beneficial for learning. It promotes socialization and creates bonds among the students. A strategy I use to get students to begin discussing mathematics is called **think-pair-share.**[2] During lectures, I pick a challenging question that lets students engage and share with others. They will **think** about the question and answer for themselves, then **pair** with a friend and finally **share** their thoughts. This strategy helps them learn by doing math and practicing the communication of mathematical ideas. An example of the type of questions that I ask is: *Why do we change the symbol of inequality when multiplying by a negative?* By **thinking** for themselves, they will learn that this is not just a procedure that needs to be carried out when solving an inequality, they will analyze the reason for this step. **Sharing** their thoughts will help the idea sink in and promote the exchange of mathematical thoughts.

Another strategy I use to encourage students to communicate their thoughts is using quizzes with **pencils down time.**[3] I design quizzes with thoughtful questions that should be done in around twenty minutes. During the first ten to thirteen minutes, the students must attempt all the questions. Then, I instruct them to stand up and put their pencils down. Nobody is allowed to write during the next 5 minutes. Rather, students talk to their peers during this time to discuss areas on the quiz where they might be stuck or to check if they are approaching the questions correctly. The discussion during the quiz provides a non-intimidating environment where they can communicate their mathematical thoughts.

Proactive learning

I aim to teach my students to be proactive and preemptive because it will help them do better in my class, support them navigate college and develop skills for life after graduation. A way to promote proactive learning is through **habit points.** This means that students can collect points for attending office hours, finishing their homework early, organizing study groups, writing a math post, sharing their thoughts on our Canvas page, creating a plan to improve their learning the following week, etc. I have them do things that are often overlooked due to time constraints. These habit points are collected weekly. The repetitive habit collection helps students see that this is beneficial in my class and they can start doing it in other classes. These are habits that are easily transferable and helpful. Habit points will account for a percentage of their final grade. If they collect more points than the goal, then it will be extra credit.

An additional strategy I use is an assignment that will help students create a plan to prepare for an exam. Frequently, students prepare for an exam a day before it will happen. It impacts them negatively since they will not be ready after studying all night. Instead, I like to promote an assignment to reflect on their strengths and find weaknesses. This assignment consists of having them write one problem from the textbook for each topic in the upcoming exam. They must solve

[2] *What Is the Think-Pair-Share Strategy in Teaching? A Collaborative Learning Routine*, Dana Leon. April 2024.
[3] *4 Powerful Strategies You Can Use Right Away*, Carnegie Learning.

these problems in test-like conditions, look at the answers afterward, write some feedback and finally do it again without looking at their answers if they did not get it right the first time. They will use the **traffic light system** to represent how they feel about the problems: **green** means they solved and understand the problem, **yellow** represents that they made some mistakes or did not show clear work and **red** means that they do not know what is going on with the problem or it seems confusing even after looking at the solution.

Evaluation of progress and areas of growth

I use a few systems to evaluate the progress of my goals. One of them is a **check-in** system. Most days, when we do not have quizzes or exams, at the end of the lecture, I ask a question to get some feedback or to make my students reflect on something. For example, two or three weeks before an exam, I will give my students the following prompt: *What strategies will you use to prepare for the exam? A strategy I recommend is to dedicate a couple of hours per day for the next 10 days to solve textbook problems. Is this something you already do or would this be a new way of studying?* I intend to start a conversation around exam preparation, see their answers, and address these responses in upcoming lectures. I grade check-ins based on participation and count them toward the final grade. It also helps me to monitor students' attendance, which is helpful when a student inquires about their performance in the course. Overall, check-in questions are a flexible approach that gives me insight into many questions ranging from feedback on my teaching to how well students can hear me in the classroom.

While I have identified many strategies that have helped me become an effective teacher, there are some areas where I can continue to develop and grow. I would like to improve my classroom management skills. For me, this would look like more student engagement and maintaining classroom decorum. Going back to my objectives, I would like to perfect my strategy when preparing students for the pencil-down quizzes. One of the main difficulties in this activity arises when students do not study the material beforehand and the discussions are not as beneficial. Currently, I improve my teaching by implementing the feedback from my colleagues and course coordinators following a teaching observation. Also, I like to use school resources like the teaching center at the University of Utah, which provides services for instructors emphasizing pedagogical practices and teaching strategies. At **University of XYZ**, I look forward to contributing by implementing these objectives. I also hope to engage with colleagues in conversations about teaching practices.