A Statement of Teaching Philosophy

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Based on my teaching experiences at University of California, Los Angeles (UCLA) since 2016, and Indiana University Bloomington (IUB) in 2014, my objectives as an instructor, especially for the non-math majors to learn the undergraduate math courses, consist of the following three goals: (1) Building Logical Thinking. (2) Reducing Mathematics Anxiety. (3) Fostering Learning Habit. My belief is that a good instructor should be truly enthusiastic about teaching and committed to it, having genuine care of the students about their long-term benefit and welfare, decisive and efficient but also humble enough to listen to and learn from the students, and treat them as utterly equals. In UCLA, I taught various courses required by most scientific majors, including M171 Stochastic Processes (seniors), M170A & B Probability Theory (for the juniors and seniors), M32B Multivariable Calculus (for the freshmen and sophomores). In IUB, I taught a class M025 Precalculus (for the freshmen) designed to prepare students for basic calculus. All these courses were very well received by the students.

Building logical thinking

Logical thinking is the core of the philosophy of Mathematics: technically everything in mathematics can be built based on fundamental concepts and logical deductions. For the students as learners in a specific subject, I emphasize not only on the skills to solve specific problems but also a thorough understanding of the basic notions and their logical connections.

I aim at conveying a conceptual logic framework of the subject to my students throughout the class. For this purpose, I prepare all the lectures of the whole semester beforehand, and then sort out the core concepts and the logic framework networks among them. I always start the course giving my students this concept map of the full contents. For example, in Precalculus, I introduced in the first class the hierarchy of the core concepts consisting of the real numbers, the algebraic and fractional expressions, the equations and inequalities, and functions and their graphs. I emphasize on the logic links of the concepts, instead of throwing them out like isolated pieces of the jigsaw. For instance, in M32B Multivariable Calculus, before introducing the fundamental theorems of vector analysis, I first talked about how Generalized Stokes Theorem is a generalization of Greens Theorem, Stokes Theorem, and the Divergence Theorem. In Probability Theory, to introduce the exponential distribution, I showed its derivation based on the approximation of the renormalized geometric distribution. My grading system also concentrates on how much my students have developed the style of logical thinking, and the exams consist of mostly basic problems stressing on comprehensive understanding of the essential concepts rather than high-end techniques.

Reducing mathematics anxiety

For the students, especially the non-math majors, the process of adopting logic thinking is often long and some times cumbersome or even emotionally exhausting. I feel for them and put it as my priority to help them to reduce the anxiety and I also try to get them to be more interested in mathematics.

I strove to foster an enjoyable atmosphere to motivate my students to invest time and efforts into my courses. I try my best to create dialogues with my students and encourage them to participate actively in the lecture and ask questions, and to never be afraid of making mistakes. I make eye contacts to keep everyone tuned in in class. For complicated problems, I show how they can be split into smaller and more feasible ones. I also convince my students that there is a lot of interplay between the mathematical theories and the real world. For example, in Stochastic Processes, when talking about the martingales, I will illustrate its history coming from the study of gambling and
fair games. I encourage my students to work in groups, as discussion and collaboration with peers usually alleviate one’s pressure. I assure them that as long as they have tried, I would be proud of them, no matter what grades they achieve in the end. What I would like them to achieve is them pushing their limits to learn more.

**Fostering learning habit**

Having prepared my students with the right mindset, I help them to foster good habits to learn mathematics. I stress on critical thinking, the reasoning ability, and a capacity for self-direction, self-monitoring and self-generation of ideas.

I emphasize that it is more important to know how to ask questions than to answer them. In this way, I hope to lead my students to think critically, rather than memorizing specific solutions to specific problems. For example, instead of providing solutions directly I encourage my students to design the strategies of approaches themselves. In Probability Theory, I encourage them to question and examine the efficiency of the probabilistic models in the textbook. After solving a problem instead of stopping right there I ask them to think deeper, and try to find out e.g. how the basic concepts are involved in this problem, are there any other solutions etc. I also encourage my students to understand one concept from multiple angles. For example I introduce the notion of communication of the states in a Markov process from both the probabilistic and algebraic view.

**Enthusiasm about teaching**

I have always enjoyed teaching and show in class every time with energy, animation and enthusiasm. I also try to put myself in the shoes of my students, and think like and for them, instead of thinking only from the point of view of an instructor. I encourage my students to give me feedbacks in any way that they feel comfortable with, be it in person, via email, or through anonymous notes. In M025 Precalculus, every two weeks sheets with the question “How you would like the instructor to improve” were distributed in class and collected in an anonymous fashion. I also consulted frequently with the undergraduate secretary in UCLA to learn the first-hand information about the general concerns of the students taking mathematics courses. My students are willing to share with me their life stories. Once in UCLA a student expressed deep sadness over her bad performance in the midterm. I walked with her around campus and shared with her my own struggles with study and how I conquered those obstacles. I later received a Thank-You Note from her (see the first item in the Appendix). I care about the success of my students not only in my class, but also in life in the long run. When they expressed the interests in pursuing further studies like attending master or PhD programs, I gave them encouragement and support like writing letters of recommendation for them.

I am continually reflecting on my teaching methodology and examining the effectiveness. After each lecture, I will sit down for some time, reflecting on how the lectures went, especially the students’ reactions, and picturing many different ways to present the same material. After this brain storming session, I take notes and make necessary changes to my lecture notes. Thus each time I teach the same course, I never reuse the same materials but rewrite the notes with what I have gathered from the previous teaching experiences.

Besides the above mentioned, I grab every chance to learn about teaching. Before teaching a new course, I consult with all the senior lecturers that I can find who have taught the same course and invite them to visit my courses and make comments. I also read books about teaching and psychology. Teaching is more than a job but a call of duty to me and my students progress is the best reward. I am willing to keep growing and excelling, and thereby to benefit my institute and, most importantly, my students.

To conclude, as an instructor, I believe that the seeds of the capacities of logical thinking are already in the heart of every student and what I need to do is to awake and nourish them, with strategies, patience and trust. Moreover the learning process is a collaboration between the students
and the instructor, and a dialogue in and outside of the class needs to be created between both parties instead of a monotone preach. Finally I strive to help them to form the habit of critical thinking and the ability to learn quickly not only in mathematics but also in other fields.

Appendix: feedbacks from my students

1. “Thank you so much for your inspiration and welcoming teaching this past quarter. I will miss the feeling of looking forward to your office hours – you made it quite easy to enjoy working through math. You have helped me see my education and myself from a new perspective, able to show me that endless doors open when you have faith in yourself. UCLA and the field of math is so very lucky to have you. Thank you again for all your have done for me and your students.”
   — A handwritten Thank-You note from my student in M32B Multivariable Calculus, Spring 2016

2. “Professor Wang was a really good teacher! She cared a lot about her students and I enjoyed her teaching style. I like how she first introduced the topics conceptually and then went into examples. She is very approachable and fair with her homework and exams. I think she did a really good job, especially for her first year teaching! She is the best math professor I have had at UCLA so far.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

3. “This is the first year Professor Wang has been teaching. I was really surprised that Professor Wang did really excellent job on teaching and explaining the hard materials. She is really good at explain the really difficult materials to simple and clear concepts. She is a really great teacher because she is really patient and kind.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

4. “Professor Wang was extremely kind and a good lecturer! She was always willing to help you and explain concepts in further detail if you were having trouble grasping them. Math 32B is an extremely difficult class, but she made it pretty enjoyable and not too stressful. Her tests were extremely fair. Not to mention, she was really funny and perky, which made lectures all the more enjoyable!”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

5. “Your enthusiasm for teaching math and efforts to explain it remarkably well helped me succeed in Math like I never had previously at UCLA. You remembered my questions in office hours even a week after I had asked them in class and were never satisfied with your explanation until I fully understood where my thinking was incorrect.”
   — An email from my student in M32B Multivariable Calculus, Spring 2016

6. “Your style within office hours is extremely helpful, and such a rare, invaluable thing to have in today’s college experience. You never tell students what the answer is directly, rather, you provide context, go above and beyond what you are asked to do, and help students see the bigger picture, which in turn, helps them feel as though they have mastered the material to the extent that they can apply it without being told "hints" on which theorem to use, etc. The exams are a perfect level of difficulty, challenging, but if one were to work very hard, definitely possible to do well on. Your amount of office hours has been essential to my learning process. In addition, your concept map to start off every lecture has really helped me keep track of old material while building on it with the new material. Your detailed explanation of each step you take (you do not skip steps or assume we know everything while talking) has helped me with my confidence as a student. Thank you for shaping my passion for math more than any teacher I have ever had at UCLA. UCLA is so lucky to have you!”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016
7. “Professor Wang always comes to class with full of energy. She is excited, animated, and enthusiastic during class and truly cares for students learning. Her willingness and efforts to seek various sources to present to us what she believes is the best really impressed me. Whenever a student asks a question in class, she always makes sure to answer it using emails if she could not answer it during class. And she made sure that she corrects every errors she made during the previous lectures so that we are not misled...I really do believe Professor Wang would give some thorough thoughts about my suggestions and try her best to improve the course, because she is such a humble and caring educator. She has worked very hard this quarter, and I wish her all the best in her future teaching/research.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M171 (Stochastic Processes), Spring 2017

8. “I am a student in your math 32B class and I just wanted to take a few seconds to thank you for this quarter. I greatly enjoyed your lecture style and willingness to always help during class and during office hours. I believe that I progressively improved in math from this class and performed better on each exam along the quarter. Thank you and have a great summer!”
   — an email from my student in M32B Multivariable Calculus, Spring 2016

9. “Everything for the class was excellent. I truly felt like Professor Wang had a vested interest in her students’ learning. Exams were fair and effective. Lectures were clear and VERY helpful and inspiring! Because of this class and instructor, I felt inspired to learn again after a couple of rough math quarter.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

10. “I greatly enjoyed your lecture style and willingness to always help during class and during office hours. I believe that I progressively improved in math from this class and performed better on each exam along the quarter.”
    — an email from my student in M32B Multivariable Calculus, Spring 2016

11. “Professor was very enthusiastic about teaching and making sure the class understood.”
    — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

12. “Instructor was very NICE, and willing to work with students to improve our grades, learning, and any other stuff related to math.”
    — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

13. “She was extremely sweet and helpful!”
    — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

14. “She was always willing to help, and make sure you understood something. She was also very nice.”
    — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

15. “She was willing to put in a lot of time outside of class/willing to compromise with students.”
    — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

16. “Extremely concerned about how students do in her class, and very helpful outside the classroom. Willing to teach more than the course requires.”
    — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M170A Probability Theory, Spring 2016

17. “I really liked the availability of her office hours! She definitely cares a lot about the class, the source material, and the students.”
    — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

18. “Professor Wang does her best to teach the class and is always offering help. Just perfect.”
    — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016
19. “Prof. Wang is definitely an excellent professor. She is very friendly and open minded to all questions and suggestions. She prefers to teach students the way of thinking instead of some specific ideas. In general, love her and her classes.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M170A Probability Theory, Fall 2016

20. “Professor Wang’s efforts to connect concepts in the textbook to real life applications was commendable. Rarely do my previous professors even attempt that! Her accessible and frequent office hours were a plus. Thanks, Professor Wang! :)
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M170A Probability Theory, Fall 2016

21. “The professor loved to give us a roadmap of all of the different types of integrals we would be expected to perform by the end of the course. In addition, the professor would do her best to explain concepts she thought were difficult to understand, and the professor loved using visualizations to help us see what exactly she was referring to. I felt that the roadmaps and visualizations were useful.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

22. The course is step by step building on what we already know so it was helpful.
   — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

23. “Overall, she was very fair with her exams and I liked how she presented the courses topics before we started so we know what we would be learning and how it was applicable.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

24. The teacher was great, she always had great notes planned for class and taught the material well. vskip - 1 mm — https://coursequestionnaire.iu.edu/Blue/, M025 Precalculus, Spring 2014

25. “Professor Wang was very clear in her lectures and was always available to answer questions. She was very friendly and approachable as well.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx, M32B Multivariable Calculus, Spring 2016

26. “Professor Wang’s lecture is really organized and she uses different color of chalks to make things clearer. Her lecture is also engaging and interesting.”
   — https://be.my.ucla.edu/ClassClimate/ccInstructor.aspx M170A Probability Theory, Fall 2016

27. “you are one of the professors that gives the most inspirations during my study...I had a great time taking Math 170A with you last year. Your lecture is so well-organized, and I had a lot of thinking inspired by questions you asked us both during the lecture time and office hours.... In addition, thank you for always staying after lectures to answer me and Aaron’s questions.”
   — An email from my student in M170A Probability Theory, Fall 2016

28. “I really really like your class. The teaching is so clear and organized.”