Teaching Statement

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> "Teaching and learning promote and enhance each other."
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> —The Book of Rite, Warring States period.

This Chinese quote on teaching and learning reveals the mutual benefit between them. Although I read it as a teenager, not until 2014, when I first taught as an instructor, did I finally begin to better understand the nature and connections between teaching and learning. There are several key concepts, such as

- motivation and inspiration, as William Arthur Ward said "*The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires.*";
- engagement, by, e.g., group discussion, asking and answering questions;
- systematical training plans and course designs, by organizing materials, setting appropriate homework assignments, quizzes, and tests;
- involvement of undergraduate or even graduate level research projects (, as my published my first paper as a junior student);
- and finally the cultivation in active pursuing.

My ultimate goal is to *cultivate the students necessary skills in problem solving*, such as critical thinking and communication, and *finally to guide the students into becoming self/independent math learners outside the classroom.* This is important as many job and graduate programs require the candidates to study some topics independently, which also applies to other majors, not only restricted to mathematics.

1 Diversity and Abundance

As shown in Appendix B, up to now, I have lectured

- 18 sections, of 10 different regular math courses, including various levels of calculus, linear algebra, probability, complex analysis, and number theory, at three different institutes;
- and 5 independent study, i.e., reading courses, for completely different topics, e.g., combinatorics, analytic number theory, quantum computing, and algebraic geometry.

In general, for basic math courses, e.g. calculus, linear algebra, I have no preference, as all such courses are essential and important to students majoring in STEM. Meanwhile, as my research topics include several branches, such as combinatorics, (analytic and algebraic) number theory, etc., many advanced courses, e.g., complex analysis, abstract algebra, also fit my area perfectly.

Take MATH301–Advanced Introduction to Probability at Duke Kunshan University (DKU) as an example. This course was designed by me upon my arrival at DKU. Many ingredients were taken into consideration, including but not restricted to the seven-week session structure at DKU, undergraduate curriculum, related major requirements, and other courses. The course serves as an elective in math major, and also consists of important materials for further courses, such as MATH405—Financial Mathematics. Some research topics, e.g., probabilistic methods, Shor's algorithms in quantum computing are also introduced as the very end of the class.

2   Adjustment and Improvement

Teaching and learning is a dynamic process, so adjustment is required almost every single time. I am always willing to modify part of my teaching and adopt new already tested techniques into my course. This continuous adjustment encourages me to constantly reconsider the purpose and aims of the course and my teaching strategies. Moreover, comments on each course's evaluation are also helpful for improvement. The current average of the overall score and some comments show that I am a "good teacher"; still, there is room and space be become a better instructor.

In order to constantly improve my teaching, I am also engaged in many activities. For instance, I led two sessions by the Center for Teaching and Learning (CTL) of DKU, on the usage of MaxHub[1], a digital whiteboard in hybrid teaching; and WeBWorK[2]. Also facilitated by the CTL, I was selected as one of the two instructors at DKU to conduct the Gradescope[3] Research Project, awarded a grant of $2,000. Gradescope is a digital grading system that allows instructors to scan and upload exams, and to grade them online. It reduces the grading time for classes of large size and digitizes the tests. Right now, I am selected as a member of Faculty Learning Community (FLC) 2022-2023, across all disciplines, to discuss and learn from each other in teaching.

3   Technology and Innovation

Doubtfully, the mostly common used software during pandemic online and hybrid teaching would be Zoom; however, the use of Zoom does not stop after switching back to in-person teaching: some functions are still beneficial. For instance, sharing via Zoom with allowing annotation for the whole class, largely engages students in questioning and discussions. As an instructor, any new technology and innovative methods attract me, though I am cautious in applying them. Once considered matured, such innovation will be carried out in my class.

As mentioned above, I have successfully introduced MaxHub, WeBWorK, and Gradescope to my class. Besides, during Spring 2022, I completely used Mathematica[4] as the platform for the course MATH201–Multivariable Calculus. More precisely, all the lecture notes, slides, and some graphic animation are given in Mathematica. The power of graphics plotting perfectly matches the contents of the multivariable calculus course, where many 3-dimensional graphs need to be visualized. Students manipulated the 3D plotting and animated some processes, such as the movement of a particle along a space curve. Assessment also includes a team based project in Mathematica.

Admittedly, there is always a distance from being a great teacher, and I am willing to constantly improve in teaching. As my experience growth, my teaching will be more effective, diverse, and innovative. My enthusiasm and commitment will never decrease.

A   Teaching Grant & Award

2022–2023	Faculty Learning Community Grant	Duke Kunshan University
2022	Gradescope research project grant	Gradescope
2012–2013	Excellent Graduate Student Teacher	Math Department, Tulane University

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[1] https://www.maxhub.com/

[2] https://openwebwork.org/

[3] https://www.gradescope.com/

[4] https://www.wolfram.com/mathematica/

B   Teaching Experience

2023 Spring	MATH205	Probability and Statistics	@ Duke Kunshan University
2022 Fall	INDSTU 391	Introduction to Algebraic Geometry	@ Duke Kunshan University
	MATH 105	Calculus	@ Duke Kunshan University
	MATH 306	Number Theory	@ Duke Kunshan University
	MATH 301	Advanced Introduction to Probability	@ Duke Kunshan University
2022 Spring	INDSTU 391	Variational Quantum Algorithms	@ Duke Kunshan University
	MATH 201	Multivariable Calculus	@ Duke Kunshan University
	MATH 301	Advanced Introduction to Probability	@ Duke Kunshan University
	MATH 201	Multivariable Calculus	@ Duke Kunshan University
2021 Fall	MATH 105	Calculus	@ Duke Kunshan University
	INDSTU 391	Riemann Zeta-Function	@ Duke Kunshan University
	INDSTU 391	Quantum Algorithm	@ Duke Kunshan University
	MATH 306	Number Theory	@ Duke Kunshan University
	INDSTU 391	Combinatorics	@ Duke Kunshan University
2021 Spring	MATH 205	Probability and Statistics	@ Duke Kunshan University
	MATH 301	Advanced Introduction to Probability	@ Duke Kunshan University
2020 Fall	MATH 105	Calculus	@ Duke Kunshan University
	MATH 201	Multivariable Calculus	@ Duke Kunshan University
2019 Summer	MATH 1030	Matrix Theory and Linear Algebra I	@ Dalhousie University
2019 Winter	MATH 3080	Introduction to Complex Variables	@ Dalhousie University
2016 Spring	MATH 1160	Long Calculus II	@ Tulane University
2015 Fall	MATH 1310	Consolidated Calculus	@ Tulane University
2015 Spring	MATH 1210	Long Calculus I	@ Tulane University
2014 Summer	MATH 1160	Long Calculus II	@ Tulane University