Teaching Statement

Miao Qiao

Aiming to inspire students and ignite their interest in data science and database technologies, my pedagogy is shaped through iterative reflections guided by Kolb's experiential learning cycle.

Overview. Since joining the University of Auckland faculty in 2018, I have independently designed and delivered the postgraduate course COMPSCI753: Algorithms for Massive Data. My SET evaluations for this course reported a high satisfaction rate (SR) of 88.9% in 2018 and 93.3% in 2019. Subsequently, I joined the teaching team for the database courses COMPSCI351/COMPSCI751/SOFTENG351, which serves over 400 students annually due to its professional significance for CS/SE students. Before my involvement, the course faced challenges, with student satisfaction (SA) rates at 38.7%, 24.5%, and 30% from 2016 to 2018 due to the abstract and system-oriented nature of the content.

In 2021, I collaborated with colleagues to restructure the course and developed new, research-informed content to enhance student engagement. For the first time, COMPSCI351 achieved an SR of $\geq 70\%$. Despite the challenges of teaching during COVID-19 disruptions, my efforts to enhance pedagogy further improved outcomes, with my SR for COMPSCI751 reaching 92% in 2022.

Engaging students' interest has also been critical in my mentoring approach. I foster intensive, interest-driven academic discussions with my students, which have resulted in high-quality research publications. For example, my first Ph.D. student, Wentao Li, graduated in 2021 with four publications in top-tier venues, including two in SIGMOD, the leading database conference. He is now a lecturer at the University of Leicester, UK. My current Ph.D. student, Yizhou Dai, has published a SIGMOD paper (2022) and a PODS paper (2024), with our discussions often sparking novel ideas.

Interest is the engine of achievement. A student remarked in SET-SOFTENG351-2021: "Miao expressed the most enthusiasm for the course content, which went a long way." I aspire to continuously refine my pedagogy to influence students as profoundly as my own teachers have influenced me.

Iterative Reflections. Over the years, I have implemented observation-reflection-action cycles to improve my teaching. Based on SET evaluations of the database course in 2019 and 2020, we introduced the following key improvements in 2021:

- **Building and mentoring the tutor team.** The 2019 evaluations highlighted challenges in tutorial delivery, critical for a course combining theory and practice. To address this, I helped establish an effective tutor team in 2020, holding weekly meetings to set objectives, provide support, gather feedback, and adjust lab materials. This approach garnered positive feedback, even during COVID-19 disruptions, with 11 out of 19 SET-COMPSCI751-2021 comments praising lab sessions.
- **Piazza Q&A quality control.** Limited face-to-face interactions in 2020 led to a surge in online queries, with 622 questions posted on Piazza during my six weeks of teaching. Reflecting on student feedback, I introduced structured management practices for Piazza, resulting in a 104% improvement in online teaching SR compared to 2020.
- **Integrating research-informed content.** To prepare students for rapidly evolving database technologies, I introduced cutting-edge topics, such as column-store and LSM-tree structures, in 2021. Peer-reviewed by my colleague Prof. Gill Dobbie, this content received positive feedback:

"The last part of this lecture is quite complicated but really helpful in understanding database concepts."

Supervision Trajectory. I have successfully supervised 8 Honours, 9 Masters, and 2 doctoral candidates to completion.

- **Wentao Li (Ph.D., 2017–2021):** Published four papers in top venues, including two at SIGMOD (CORE A*, acceptance rate 17.4%), and was recognized among the 2021 Global Top 100 Chinese Rising Stars in AI. He is now a lecturer at the University of Leicester.
- **Zijin Feng (Ph.D., 2020–2024):** Published one ICDE paper and two SIGMOD papers during his candidature. He is currently working in Huawei, Hong Kong.
- **Yizhou Dai (Ph.D., ongoing):** Through rigorous discussions on problem formulation, algorithm design, and experimentation, he has published one SIGMOD paper and one PODS paper to date.

Teaching and mentoring are core to my academic journey. I firmly believe in the transformative power of education and aim to create an environment where students are not only equipped with technical knowledge but are also inspired to think critically and creatively. My teaching philosophy revolves around fostering curiosity, supporting collaborative learning, and connecting academic concepts to real-world applications. I am deeply motivated by the impact I can make as an educator and mentor. Just as my teachers once inspired me, I strive to leave a lasting positive impression on my students, encouraging them to achieve their fullest potential.