Minhyuk Ko | Teaching Statement

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Whether guiding students through debugging challenges, sharing career advice at campus events, serving as a judge at a hackathon, or teaching a classroom of 94 students, I find each opportunity to engage with students both energizing and rewarding. I aspire to seek more opportunities like this post-graduation.

Teaching Experience

I was fortunate to do my PhD at an institution that offers plenty of resources to help prepare future faculty. I completed the Future Professoriate Certificate and the Global Perspectives Program (GPP), where I visited academic institutions in Europe to examine differences in academic practices and to develop innovative and effective approaches that foster international awareness and education. In addition, I enrolled in programs that are specifically aimed at future Computer Science (CS) instructors, such as the Apprenticeship Program for Future CS Instructors and the CS Pedagogy course. Furthermore, to refine my communication skills with students, I served as the President of Blacksburg Toastmasters Club, an organization that teaches public speaking and communication skills, for the past three years. This has equipped me with practical skills that I can apply in the classroom, such as utilizing multimedia to engage the sensory and working memory of the students.

Teaching Experience - Undergraduate Software Engineering .....
In the Spring 2026 semester, I was chosen to serve as an instructor of record for the undergraduate software engineering course at my institution. One successful strategy that I used while teaching was applying **schema learning** in my classroom, where I helped students connect new concepts to ones that they already know. For example, when we learned about dark patterns, I went to an airline website, which is a website that most people have experience using. I discussed the dark patterns that we can find on the website while I was trying to book a flight. Students were actively engaged during this activity, and I was happy to see most students getting the dark pattern question correct on the midterm!

Another teaching approach that I applied is **multimodal instruction**. At institutions such as Virginia Tech, where the student body is diverse, it is hard to find a one-size-fits-all solution. For example, some students are visual learners, while others are kinesthetic learners. To help as many students learn as possible, I presented course materials to students in various formats, such as live demos, presentation slides, in-class activities, and a whiteboard. This has also helped with flattening the forgetting curve as students were repeatedly exposed to course materials over time.

Teaching a large course (94 students enrolled) presented challenges in fostering a sense of community. This was evident when students had to work in groups of 4-6 on a semester-long project. I realized that students did not know each other, making it difficult to connect with their teammates. To foster a sense of community, I started each class by solving Wordle together, a low-stakes activity that helped students feel more comfortable and connected with their peers.

Another strategy that I used to apply **inclusive pedagogy** in the classroom was incorporating Mentimeter, an interactive platform where students can anonymously share their thoughts and experiences without fear of judgment. This approach lowered barriers to participation while promoting **active learning**. Students provided fun and creative responses, and the classroom was quickly filled with laughter and energy. These experiences reinforced my belief that **effective teaching requires not only delivering course content but also creating an inclusive environment where every student feels comfortable participating and contributing**.

Students **loved** my teaching style. In fact, I received a mean student evaluation score of 5.35/6 as an instructor, which is significantly higher than both college (Mean: 5.17/6, $p = 0.0128$) and department (Mean: 5.09/6, $p = 0.0004$) averages. Students also provided me with enthusiastic comments, such as:

- Great professor. Give him tenure immediately.
- He gave funny helpful examples which helped me enhance my understanding and learning during the duration of the course.
- Gave meaningful feedback on assignments and ensured that students were prepared to succeed in the course.
- Very passionate about what he teaches and I value that a lot.

Future Teaching: Beyond the Classroom

I believe that effective teaching extends beyond the classroom. Through interacting with students outside the classroom, I aim to develop stronger personal connections where students feel more comfortable asking questions and participating in class discussions. As a future faculty member, I aim to make myself approachable and accessible to students both inside and outside the classroom, creating opportunities for informal interactions where students feel comfortable discussing not only course materials but also broader topics, such as career advice and work-life balance. By building these connections outside the classroom, I hope to create an environment where students feel a stronger sense of belonging in the classroom, discipline, and university. To achieve this goal, I plan to engage in the following activities:

Building Community Beyond the Classroom
As an instructor, I enjoyed providing students with various pieces of advice when I encountered them outside the classroom, such as at on-campus events and on the bus. As a future faculty member, I am interested in facilitating various on-campus events where I can organically foster more interaction with students outside the classroom. Examples of events I can host include ice cream socials, coffee chats, board game nights, and picnics. I will also look for ways to get involved in existing student activities, such as serving as a judge at a hackathon or as a faculty advisor on student organizations. Ultimately, my goal is to help students feel a sense of belonging, as research shows that the development of a sense of belonging on campus is one of the main drivers of retention, especially for marginalized communities such as first-generation college students [1].

Study Abroad
Due to globalization, a lot of software development teams are international. A lot of big tech companies outsource their projects and hire engineers from all around the world. As software development teams are becoming more diverse, bridging cultural differences becomes more challenging. One of the best ways for students to understand different cultures is by participating in a study abroad program. My research has shown that students were able to feel more confident that they can work with programmers from different cultural backgrounds after participating in a CS study abroad program [3]. As a future CS faculty member, I plan to facilitate a CS study abroad program by collaborating with the global education office. As demonstrated in my work, students will be able to learn different ways to approach a CS problem by working with students who have gone through different CS curricula.

Course Interests

My PhD research focuses on helping programmers solve programming problems. I have found that CS courses do not usually focus on effective and relevant debugger usage, leaving students with a lack of knowledge in this area [2]. In the courses that I teach, I aim to bridge this gap by teaching students how to effectively use debugging tools and develop developers' mental models that extend beyond the classroom.

- Introduction to Computer Science: In this course, I will teach the basics of computer science. As my prior work [2] has demonstrated that debugging is one of the most tedious tasks to learn in Computer Science, I plan to help students start to get exposed to debuggers by teaching the basic features of debuggers in this course. My goal in this course is to help students develop a developer's mental model by helping students understand how the computer executes the code that they have written.
- Data Structures and Algorithms: I will teach key data structures that students will encounter in coding interviews in this course. I will use debugger visualizers so that students can see how pointers connect nodes in linked lists, trees, and graphs. I will also do a live demo of solving LeetCode problems and demonstrate how I use debuggers to debug LeetCode problems.
- Introduction to Web Development: In this course, I will provide a comprehensive introduction to web app development, including JavaScript and React. Front-end debugging poses different challenges and has sophisticated tools of its own, and I plan to introduce debugging tools and techniques that are unique to web development.
- Advanced Debugging Techniques: Although I plan to teach debugging skills for every programming class I teach, I cannot cover every aspect of debugging due to time constraints. I plan to develop a dedicated course for debugging where I teach advanced debugging techniques, such as exploring numerous agentic debugging IDE plugins in the VS Code Marketplace. In this course, students will be able to get more practice with debuggers, which will help them in advanced computing courses, coding interviews, and their industrial career.

References

[1] Ida R. Salusky, Lidia Monjaras-Gaytan, Grevelin Ulerio, Nicola Forbes, George Perron, and Elizabeth B. Raposa. The formation and role of social belonging in on-campus integration of diverse first-generation college students. *Journal of College Student Retention: Research, Theory Practice*, 26:473 – 499, 2022.

[2] **Minhyuk Ko**, Dibyendu Brinto Bose, Hemayet Ahmed Chowdhury, Mohammed Seyam, and Chris Brown. Exploring the barriers and factors that influence debugger usage for students. In *2023 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, pages 168–172. IEEE, 2023. **Best Short Paper Honorable Mention**.

[3] **Minhyuk Ko**, Mohammed Seyam, and Chris Brown. Programmers without borders: Bridging cultures in computer science study abroad program. In *2025 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, pages 385–390. IEEE, 2025.