

Teaching Statement

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Students often focus more on earning the grades they need for their academic career than on enlightening their minds. This harsh truth makes teaching in today's classroom much more difficult and challenging. During my teaching experience, I have had the honor of working closely with my students in lab classes. Through this intimate teaching setting, I have found that students who strive to understand the material often perform better than those who focus exclusively on high grades. Consequently, I feel a responsibility as a teacher to motivate my students to approach their studies with curiosity and passion for learning.

My studies in Korea and the United States have exposed me to diverse teaching methods. Through my studies in Korea, I gained an appreciation for the value of a strong foundation of knowledge. A wealth of knowledge is essential for high levels of understanding. However, facts alone are insufficient for ground-breaking innovation. Creativity and free thoughts are also essential, and through my studies in the United States, I gained an appreciation for the power of creative thinking. Together, strong study skills and creative thinking form a powerful partnership. As a teacher, I strive to instill in my students the value of both knowledge and creativity. My curriculum will be designed to teach students how to study and think.

In order to fully understand the inner workings of solutions, students must possess a strong theoretical foundation. Without learning the basics, the fundamentals, the building blocks, students cannot venture too far from the shore to explore the uncharted waters where new solutions lie. The true consummation of learning for many students comes not from learning "how," but from exploring "why" and "where". Students must understand "why" the solution works, and have a clear idea "where" to apply that knowledge. Only after students delve into the inner workings of the solution is their learning complete. I feel that it is my responsibility as a teacher to instill in a student the urge and the sense of curiosity to understand the underlying reasons behind a procedure. Students must possess a strong theoretical base to fully understand computer science coursework.

At the same time, it is often difficult for students to see the value of theory if they only consider the fundamentals. I believe that the most effective courses present practical applications of the theoretical ideas in order to test, support and validate those theories leading to more innovation. This combination not only helps catch students' attention but also deepens their understanding and encourages creative thinking. Furthermore, many students study computer science with the

goal of working in industry. It is therefore important that students recognize the practical applications of the material that they study. Even within academia, collaborations with industry often yield powerful results. Incorporating applications to theory in my curriculum will help students see the value of the material. Learning the theory behind solutions is insufficient; students must also tackle real-world problems. In order to provide a complete education, a teacher must present elements of both theory and practice.

I also believe that a strong teacher-student relationship is an integral part of effective teaching. Throughout my Ph.D. studies, I have served as a teaching assistant in various courses. This work often involves one-on-one time with students in lab and office hours. Interacting with students in these small groups allows me to gauge their level of understanding. When I have a feel for what the students know and what they are missing, I can design lesson plans to meet their needs. Students learn better when new information is linked to their existing knowledge, and I plan to use this to their advantage. Such a linking stimulates their interest, which is the driving force in motivating students to acquire new knowledge.

New Course Development

As a professor, I would like to bring the exciting world of smartphone applications to life on campus in a cutting edge course. The smartphone is one of the most influential technologies that have recently emerged. As smartphones become increasingly affordable and accessible, more and more people and organizations take advantage of the technology. People at all stages in life take advantage of the technology, from business people to college students. Because the smartphone has such a large audience, the demand for diverse applications is virtually endless. My course would teach students how to take design innovative applications for this wide-reaching technology.

In order to design the most effective applications, students must have an understanding of the hardware and software provided by the smartphone. They must have an appreciation for the role of the smartphone in the world. For these reasons, I organize my course to cover the following topics:

- Software platforms
 - Two popular platforms: iPhone OS and Android
 - Hardware capabilities and limitations
 - Development environment
 - Communication infrastructure
- Individual assignments
 - Small programming assignments

- Research on existing smartphone applications
- Group assignment
 - Development of a novel smartphone application concept
 - Application design
 - Implementation
 - Private and public demo

Given the enormous potential for applications of the smartphone, I would like to expand the coverage of smartphone applications to heterogeneous wireless networks and network security. Since so many people use smartphones, and because the smartphones have wireless communication capabilities, the set of smartphones deployed in the world form a natural ad hoc network, and can be used for distributing valuable information. Currently, smartphones possess three means for communicating: wi-fi, 3G/4G, and Bluetooth. As these means of communication develop, and as new radio technologies emerge, the network formed by smartphones becomes increasingly heterogeneous. This complex, dynamic environment provides many opportunities for research and study. One of the major issues we will cover is security in such a large, heterogeneous wireless network. As computer science becomes increasingly interdisciplinary, I believe in promoting interdisciplinary thinking in the classroom as well, and I believe that this cutting-edge class will do just that.

List of Courses

I am competent to teach the following undergraduate and graduate courses:

Undergraduate Courses:

- Programming Languages: C, C++, Java
- Data Structures
- Algorithms
- Computer Networks
- Network/Internet Protocols
- Computer and Network Security
- Cryptography
- Discrete Structures/Mathematics
- Computer Architecture/Organization
- Software Engineering
- Software Paradigms
- Object Oriented Design
- Database Systems
- Theory of Compilers

Graduate Courses:

- Wireless and Mobile Networks
- Data Communications and Networks
- Internet Protocols
- Design and Analysis of Algorithms
- Graph Theory
- Computer/Network Security
- Distributed/Cloud Computing
- Cellular Network Protocols