

Project: Smart Phone teaching tools for Statistics and Mathematics

Project lead: Shaun Sun

Summary of the learning activities planned and undertaken:

A collection of smart phone and computer applets were developed. They are regularly used in some lectures of STAT 104, STAT 106 and STAT 272. These applets can illustrate fundamental concepts such as randomness, sampling, and variability through computer simulations and visualizations. Further, they are particularly useful for teaching first and second year Statistics courses since students at this level have not yet had sufficient Mathematics and Statistics background to follow rigorous proofs of concepts such as the Central Limit Theorem, the sampling distributions of the t statistic and the F statistic, Type I and Type II errors etc. and computer simulations can, to some degree, provide evidence to support the concepts.

The applets were built using the statistical computing language R and an R package called Shiny that makes interactive web apps straight from R that are accessible through both smart phones, tablets as well as computers. The smart phone and tablets accessibility is important because students can conduct simulations through smart phones or tablets held in regular classrooms (or anywhere that has internet access) to mimic a computer lab environment. This is a helpful feature for the Statistics classes at UFV since the classes typically have one third to one half of the class time scheduled in computer labs. In addition, the system can collect real time data from students so it can be used as clickers (eg. iclicker) or some of the commercial (NOT FREE) phone apps like TopHat.

The adoption of the system into the Statistics courses at UFV involved:

- Setting up a rental server to host the applets
- Identify Statistical concepts that can be illustrated via simulation
- Design applets to illustrate the concepts
- Write code or work with a professional programmer to develop the applets.
- hiring, training and supervising student coders writing up questions for the courses so the applets can function like clickers

- Hiring students to test and to modify the applets
- Supporting other UFV faculty members using the applets throughout the year

Individuals involved in the delivery of the planned project activities and outcomes:

Dr. Shaun Sun, UFV faculty, project lead

Dillon Duncan, UFV student

Noorshin Larry, UFV student

Yuqian Cui, formal UFV student

Cindy Ng, apps developer

The project adapts the latest digital media technologies and aligns with the UFV strategic goals and the SEM planning. The system provides a more engaging classroom learning environment and encourages active learning. The system can reduce the dependencies of computer labs for some Statistics classes and can save instructors and students some money when used as clickers in the classrooms.

A list of the students' comments:

1. "The applets make class much more interesting."
2. "Good idea. The internet connection was okay for simpler applet but too slow to run the more advanced applets."
3. "Wish there is an applet for all statistics tests"
4. "I seem to understand the concepts better when they are off my phone, lol."
5. "I don't have a phone"
6. "I am better with math than the modern gimmicks"