

Faculty First Grant Report - 2015

Improving teaching effectiveness by using Information & Communication Technologies in a diverse undergraduate student class

Dr. Hector Pulgar, Department of Electrical Engineering & Computer Science

Project Overview and Course Overview

The main goal of this project is to improve teaching effectiveness in ECE-325 *Electric Energy System Components* by designing a more engaging teaching plan and by using proper ICT in and out of classroom. Instead of designing one visualization per subject in this course, as it was originally thought, the project was redefined to work on one particular subject; the other concepts are left as future work. This product is then a descriptive video related to one of the subjects studied in ECE-325. The challenges faced when designing this educational video are:

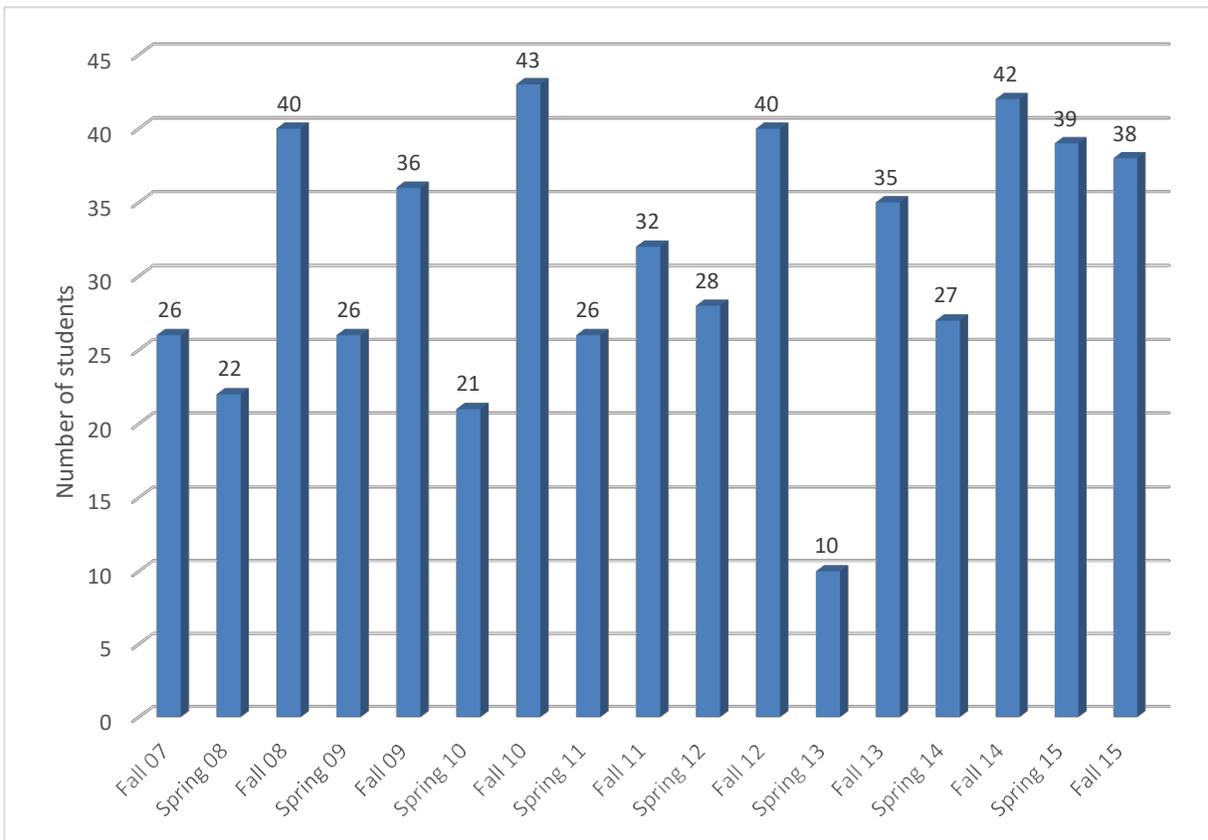
- Students enrolled in ECE-325 are diverse in terms of: (a) fields of interest, (b) academic background, and (c) motivations.
- Students, in general, do not have a global vision of what power engineering is and which are the specialization opportunities.
- There are two teaching goals depending on the student group:
 - Students that have a concentration on power engineering: Prepare them with theory and analytical skills to pursue further specialization in the area (B.Sc. in Electrical Engineering, M.Sc. in Electrical Engineering, or Concentration on Power Engineering through CURENT)
 - Students that do not have a concentration on power engineering: Prepare them with a global understanding and the ability to infer the implications of a proper/improper operation of the electric energy system components.
- When students register this course, they have not decided yet whether they will have a concentration on power engineering or not.

Semesters the course has been and/or will be taught

This educational video is planned to be used in ECE-325 starting in fall 2016. This course is offered in both fall and spring semesters.

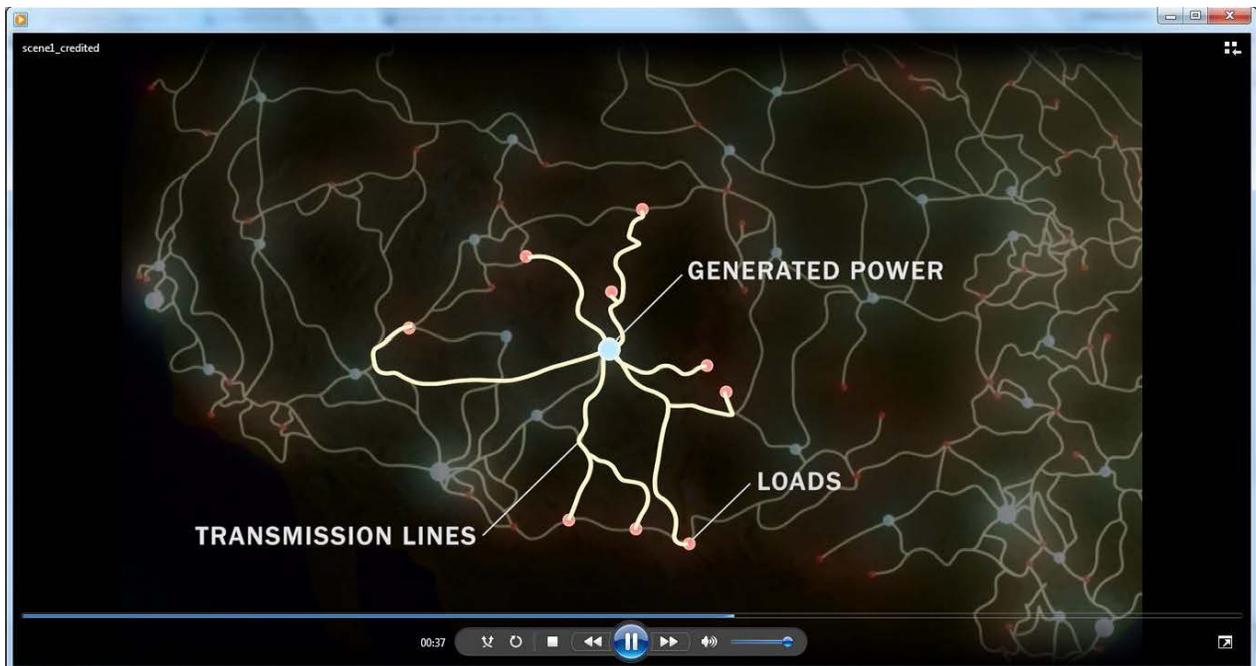
Number of students affected

The enrollment has been in average of 30 students per term during the last years. The detailed enrollment per term is presented below.



Project outcomes and products

The expected outcome is to improve teaching effectiveness, by motivating students and describing a concept through visualization that would otherwise be harder to explain. The product of this project is an instructional video that is conceptual, informative and graphically attractive to motivate students. A few samples of the video is presented below:



Student Evaluation

Assessment plan: Students survey.

When can we contact you about the results? December 2016.

Project benefits for the department and UT

This project aims to engage students in the learning process by motivating them and by explaining concepts using visualizations.

This project is aligned with the Top 25 Action Plan of the University of Tennessee, Knoxville, where undergraduate education belongs to the 5 priority areas of action. This project has the potential to contribute in the following aspects:

- Increase student success in ECE-325, which will help to meet the target of graduation in four years.
- Add visual material that will assist the student's understanding of subject.
- Maintain student quality.
- Further motivate those considering to pursue graduate studies.

Conclusion

Has this project met your goals? As this has not been applied yet, the answer remains to be answered.

What worked well and what did not work well? OIT met my expectations about creating professional looking visualizations. It didn't work well my high expectations in regards to the amount of work we would get done. Creating a single visualization is very time consuming for the faculty that has to provide the technical information and for the team that has to understand the idea and work on it. Several meetings to coordinate are required. A more realistic plan from my part would have helped us to be more productive and effective creating these visualizations.

What was your experience collaborating with OIT? We have several meetings to define the idea, to coordinate the work, and verify the progress. OIT has a great team, with qualified experts.

What are your future plans or goals regarding this project? Evaluate the impact of this product. If this shows to be important achieving the teaching goals, I would like to explain new concepts in this fashion.