Pedagogy

Παιδαγωγέω
The Art or Science of Teaching
Teaching Style – The Big Picture

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1724-1804

Teleology
How all individual components fit into a larger system
my Thesis

Exploring an effective way to teach computer engineering concepts

Using the Big Picture teaching style

Interactive Software
the Project

• Interactive Software
  – Html Format
    • Explaining each subject through links
  – Java/Flash applets
    • Electronic circuit illustrations created with components on a virtual protoboard
    • Kirchoff’s/other circuit equations described
    • Electronic components also explained
  – Also incorporating learning material as links from outside sources
Interactive Software – Electronic Components – Computer Logic
Software protoboard project – electronic components and algebra

\[ v_1 + v_2 + v_3 + v_4 = 0 \]
place components on protoboard in software

illustrates physical electronics project
relate the circuit to electrical schematic
High School Outreach Program – Professor Neil Cotter

• Introduction to Analog and Digital Electronics

• Presents physical projects and Lessons

• My Interactive Software will supplement and further teach the fundamental principles of electronics via these projects
Electronic Components and Concepts in the Software

- resistors, LED's, op-amps, switches, inductors, capacitors, transistors, LF353 OpAmp Chip, 4011 NAND Gate Chip

- voltage, power, current, Ohm’s Law, Kirchoff’s Laws
Priority List of Tasks for Thesis

Below I have outlined the tasks for my thesis based on priority. The tasks in level 1 are the top priority and will be accomplished. Level 2 and particularly level 3 tasks will be completed as time permits.

Level 1
Graphics Layout
- Circuit board
- Electronic components in box to choose from
- Place electronic component objects on circuit board
- Ability to rotate components on board
Learning - Interactive
- Explanation of each component
- Overview of a few projects + how the parts fit together
Level 2
Simulation
- Basic output waveforms at each node – voltage, current levels
- Graphic representation of short circuit/higher values than a component can handle (i.e., smoking/exploding component).
- Applied math variable illustrations

Learning
- Java applets incorporated

Level 3
Simulation
- Basic oscilloscope simulator

Learning
- Apply concepts to specific areas in classes
Work with high school teachers for each learning application based on their lesson plans.
Timeline

• Weekly meetings with Professors Cotter and Zachary for duration of thesis

• March/April – preliminary thesis proposal

• August/September – setup design layout and pseudo code, components as picture objects

• October/November - finish coding and obtain all materials from other sources

• January/February/March - work through bugs, interactivity with user, incorporate material and software from outside sources

• Done by April 1 (1 month before graduation)
Advisor - Professor Joe Zachary

• Will oversee my interactive software development
• Director of Educational Programs – CS
• Developed interactive learning software for our curriculum
  (ECE 1010 Intro to Unix, etc.)
• Currently teaching Introduction to Computing – using software to illustrate concepts
What is effective teaching?

• Describe the Big Picture
• Explain the Individual Details
• Tie the Pieces Together
\[ v_1 + v_2 + v_3 + v_4 = 0 \]