

A Multimedia-based Lab Manual: To Enrich, Improve and Expand Learning and Teaching in the Wet Lab

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We developed software, the “Interactive Lab Manual”, to support and expand existing wet lab experiments. The Lab Manual is composed of subunits, called modules, categorized as Experiments, Calculations and Techniques. Students can move unrestricted from one module to another, forming unique connections based on their individual intellectual needs and curiosity.

The Experiment Module allows students to carry out an experiment on the screen. Students are led through a protocol development, introduced to literature searching, encouraged to do the critical steps on the screen, and challenged to synthesized and construct knowledge by responding to the numerous food-for-thought questions.

The Technique Module develops theory and methodological principles behind a technique by intertwining theory and practice.

The Calculation Module allows students to practice those rusty skills one does not like to admit are deficient.

The course web is the typical entry point for a student. At one glance he/she gets an overview of the whole course and an understanding how techniques intertwine with experiments and calculations, and vice versa. Upon, selection of a module, students are transported to the module outline. The students must now decide how to move through the module: where to start, when to access additional information and what type of related information to call up. The outline suggest one possible, logical path through the material in the module, but it does not force the student to follow that track.

In addition to being a vehicle for presenting knowledge, the Interactive Lab Manual further engages students by posing questions. An Electronic Notebook built into the software allows students to record answers to these question. Very powerful is the built-in communication system between students and instructor via a user-transparent electronic mail session.

In summary, we designed software that creates a learning/teaching environment liberated from the constraints of the traditional instructor-centered way of teaching, and consequently learning. Rather than presenting information linearly like “pearls on a string”, knowledge is presented in an “onion-type” fashion with many different layers interconnected via a student-driven path. Topics are presented by using a variety of delivery tools: written words, still pictures, but -most importantly - audio, animation, and simulations.