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HOME BREW

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e Dream

In the Philippines, education is hot commodity, right up there with soft drinks and shampoo. ıantity? We got it! Quality? Ahh, that's another matter. For a teenager contemplating college the oices are many; NOT only which institution, but also what program or major.

At the Ateneo de Davao, once a bastion of liberal, humanistic education, now Business, Nursing d Engineering are currently among the top favorites. And in the Engineering area, ECE (a buzz word r Electronic and Communications Engineering) is edging out the more traditional Civil, Electrical or echanical. Since the Philippines is presently the texting capital of the world, small wonder at the mand for chip-doctors to keep the cellphone monster purring.

From an institution's point of view, Accounting is cheaper to offer than Nursing. Given alkboards and a pile of columnar pads and you're in business, future CPAs are already on your ɔduction line. But for Nursing, bedpans and sphygmomanometers are a must to have the program ɛredited. Such stuff does NOT come cheap. And ECE, without a playroom and locker chockfull of ɛctronic toys, could never get the green light from CHED.

Yes, the pertinent government boards do have listings of equipment required for program ɔgnition. But quality education itself suggests the need of hands-on experience for abstract concepts. e lecturer can draw on the chalkboard the electronic circuit diagram or, funds permitting, demonstrate ɨ circuit's theoretical response by computer simulation. Yet all this can never fully substitute for the ıual hooking together of wires and components to find what really happens. The chalkboard is the ɔry tower where assumptions are posited, models formulated and abstractions made. The student ɔoratory is the market place where what actually happens only approximately agrees with the theoretical ɔdel.

Ahh, chalk is cheap, while laboratory equipment is expensive and breakable. Excellent student ɔoratory equipment is available from first world nations but the costs are sky-high. Even an Ateneo ıld NOT afford that!

Some years back, before the Ateneo de Davao turned out its first batch of ECE graduates, ɛmbers of our Engineering and Science faculties visited several Davao colleges already offering ɛE, to view their student laboratories. We were jealous. Those schools had some equipment but in ıited quantities, while we had practically nothing.

Envy is a great motivator. To play catch-up with them we needed lots of new equipment, and t. To provide the quality of engineering education we envision and espouse, we needed much, much ɔre. We had seen at another school a beautiful set of ten student electronic modules, covering all the ɣ concepts of one third-year engineering course. Everything was there, manual and all. But with a ss of, say, 40 students during the first laboratory meeting, do all 40 students work with Module 1, or

are there 10 groups of four students, each using a different module? Working in groups of four rather than forty surely makes for better learning. Yet the downside is that most students will be performing experiments related to topics discussed weeks before in class or worse still, topics NOT yet explored in the lecture.

But we wanted to have our cake and eat it, too. We must have ten sets of everything, so group size remains small yet experiments are done concurrently with the lecture. Since we could NOT locate any flasks with genies corked-up inside to grant our every wish, we decided to make for ourselves the equipment we dreamed of. That's how our home brew project was born.

Making it real

The first step (of our journey of a thousand miles) was selecting three third-year engineering courses, namely Electric Circuits, Electronics I and II for which standard textbooks were in use. Next, specific topics were selected for which equipment was to be constructed. A standard module format was established: a gray-enameled wood frame, 6"x9", 2" high, into which was inserted a *lawanit* sheet. The appropriate computer-drafted circuit diagram beneath a protective plastic, was placed above the lawanit, all components and wiring beneath the lawanit and plated machine screws protruded through the circuit diagram at all junctions, at which voltages could be measured. An additional bottom sheet was screwed in place making the actual components and connections out of reach of inquisitive fingers.

Each module was to be student-proof: diodes (electrical one-way streets) were hidden at all inputs, in case power was applied backwards. All transistors and resistors were over-rated to prevent accidental burnout through improper connections. Two custom-designed power supplies were provided, with overload and short circuit protection. Basically, we assumed Murphy's Law ("If something can go wrong, it will...") was fully operational at all times in our student laboratory. For each experiment popsheets and data sheets were prepared, and a number of short computer programs were created to assist with otherwise tedious calculations.

The key element that made all this feasible was that for each of the forty different modules, we made the prototype in the school, and then turned it over to an outside contractor (a local radio and TV repair shop) to duplicate in quantity. Of course on delivery each module had to be carefully checked for errors. Such detailed checking was necessary since the contractor did NOT understand fully the functions of many of the modules. However his duplication work was invaluable for producing the modules economically and in quantity. It proved to be a real win-win situation on both sides.

Sharing

Once the first few modules had been produced and we saw the direction in which the project could go, we invited the three other Ateneo universities to join the project. However, only Xavier University in Cagayan de Oro expressed interest. In the first phase of the project thirty complete sets were produced, ten for Davao, ten for Cagayan and ten for other colleges that might be interested. This came to some 1,200 individual units.

In November, 2001, we invited fifteen different Mindanao colleges offering ECE to attend a one-day workshop (free registration, free merienda and lunch, free T-shirt) to examine in detail all the equipment. We suggested two different approaches for them to benefit from our work.

A: We provide you with full construction details and consultations, to help you duplicate this equipment in your own institution.

B: With a partial downpayment, we will have the modules constructed for you by our outside contractor.

All but one of the invited schools opted for "None of the above".

Ongoing

We now plan on constructing equipment for fourth-year ECE courses for ourselves, Xavier University, and other institutions that may express interest. Presently, we are also targeting the improvement of our sophomore Physics Laboratory, since this serves as a foundation for later engineering courses. Physics instrumentation is more varied, and thus far we have NOT found a suitable contractor for its duplication, so all work must be done in-house. However, we have developed three basic laboratory instruments, namely, a lab power supply, wave generator and millisecond timer, which have been duplicated in quantity outside.

Since we are convinced of the vast gap between minimum CHED laboratory requirements and what is necessary for quality engineering education, we plan on continuing and expanding the project. Moreover, we would be gratified to assist other institutions to do what we are already doing. After all, imitation is the sincerest form of flattery!