Pieces from Unisite

Stuffs I used to have on my main page at uni.

Points to Ponder

*“Try not to become a man of success. Rather become a man of **value**.”* **- Albert Einstein**

I have been thinking about creating an ideal (from my point of view) bachelor program for Electronics Engineering Curriculum.

I found this post in my old Google Currents (was initially known as Google+):



20130620094302 *Dear fellow educators... let us remember that we actually need to educate, not to teach the students how to answer questions. The students' grades are THEIR performance indicators. The tests and examinations are to evaluate the students and NOT the educators.*

Here is another one:



20130911102906 *There are many small scale microprocessor/microcontroller boards these days that offer 'simple' development environment setup/usage. To top that up, a whole library of interface codes for many commonly used devices are also provided. If you're into developing small-scale hobby projects or prototyping simple systems, this is a GREAT thing. But, if you're from computer/electronics engineering background and working in an academic institution, you're expected to know how to DEVELOP that board - not just use it. Think of what your students can learn if you strive to develop your own development board!*

Bloom's Learning Taxonomy

*“Any fool can know. The point is to **understand**.”* **- Albert Einstein**

My personal view on this.

Note *My main reference regarding this is the Wikipedia page, and this other site.*

What It Is

The original learning taxonomy by Benjamin Bloom (1956) have identified three learning domains:

Cognitive (mental skills @ knowledge), **Affective** (growth in feelings or emotional areas @ attitude) and **Psychomotor** (manual or physical skills @ skills). Bloom (and his committee) elaborated only on the first domain, with the second one defined by another group that also include Bloom (Krathwohl, Bloom, Masia, 1973). The definition of the third domain, however, was not directly linked to Bloom. Instead it has been discussed in 3 popular versions: Simpson (1972), Dave's (1975) and Harrow's (1972).

Note: *Lorin Anderson, a former student of Bloom, revisited the cognitive domain in the learning taxonomy in the mid-nineties and made some changes, with perhaps the two most prominent ones being, 1) changing the names in the six categories from noun to verb forms, and 2) slightly rearranging them (Pohl, 2000). The name changes has been included below after the original names and in bold italic. The 'create' and 'evaluate' categories have been swapped and this is thought to be a more accurate hierarchy.*

In the latest development, I can see the rationale of Anderson's arrangements where synthesis (create) is placed highest in the hierarchy. However, I think Bloom's decision to place it where it were (below evaluation) is simply based on a different point of view.The way he sees it, you cannot possibly make an evaluation if you cannot produce (synthesis) something of your own - i.e. going through the experience. So, in that sense, the original Bloom's Taxonomy was, I think, spot-on. Then again, nowadays a lot of people claim themselves to be expert (making critical reviews of other people's work) when they themselves have never actually had the experience! Go watch Ratatouille and you'll understand what I mean.

So, bottom line? Personally, I think synthesis should be considered at a higher level so as to remind others that the people who do evaluation needs to actually gain that level (synthesis) before they can evaluate synthesized work! So, in a way, that's also saying evaluation is higher than synthesis. Therefore, I would place them at the same level and only those who are excellent in respective fields can acquire this level. We should not expect EVERYONE to attain them.

Note*: Just a thought - looking at Einstein's quote, notice that the point is to* ***understand****! So, in my opinion, Bloom's level 2 is good enough for general education objective. The higher levels are relatively 'expert' levels that should not be imposed on everybody. Of course, this assumes the evaluation is done correctly (because the way things are done, even the so-called cognitive-level-6 evaluation is based on things that can be memorized).*

Cognitive Domain

No matter what others say, I think this is the only domain that directly affects the learning process. This is where it all begins, and this is where it grows. So, I personally think this domain is still very much important and needs to be emphasized especially in technical education where most people thinks the psychomotor domain should be given 'equal' attention, along with affective domain. This really depends on how they define these two domains. I think Bloom was right not to define the two 'support' (at least from my point of view) domains. Although I don't deny the importance of affective domain in ensuring proper transfer of knowledge, I really think this domain boils down to ONE thing: how interested (or, maybe how motivated - but this can be discussed elsewhere) are the learners in obtaining the knowledge. And how high (or from another point of view, how deep) are they interested in going? (i.e. just want to know, capable of explaining to others, capable of improvising, etc.) On the other hand, psychomotor is really just how well our physical self can implement the knowledge. To me, all the 'advanced' levels in psychomotor are obtained through integration with the cognitive domain. (Maybe I should write a whole paragraph on this... later).

The six levels as described in wikipedia:

- **Knowledge *(Remember)*** ⇒ Exhibit memory of previously-learned materials by recalling facts, terms, basic concepts and answers
- **Comprehension *(Understand)*** ⇒ Demonstrative understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas
- **Application *(Apply)*** ⇒ Using new knowledge. Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way
- **Analysis *(Analyze)*** ⇒ Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations
- **Synthesis *(Create)*** ⇒ Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions
- **Evaluation *(Evaluate)*** ⇒ Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria

Affective Domain

From my personal point of view - when it comes to learning, as I've already mentioned earlier, this domain actually displays interest level of the student. If a student is only in the class because he/she HAS to, they will only (at most) listen or **receive** what is being taught. They will not inquire more than what is being given.

***Note**: maybe I can elaborate more later???*

The five levels in this domain as described in wikipedia:

- **Receiving** ⇒ The lowest level; the student passively pays attention. Without this level no learning can occur.
- **Responding** ⇒ The student actively participates in the learning process, not only attends to a stimulus; the student also reacts in some way.
- **Valuing** ⇒ The student attaches a value to an object, phenomenon, or piece of information.
- **Organizing** ⇒ The student can put together different values, information, and ideas and accommodate them within his/her own schema; comparing, relating and elaborating on what has been learned.
- **Characterizing** ⇒ The student holds a particular value or belief that now exerts influence on his/her behaviour so that it becomes a characteristic.

Psychomotor Domain

This domain is actually the 'physical' side of things. When this taxonomy was created, the examples given were the manipulation of tools and instruments (e.g. hand, hammer). So, translating that to the current scenario, that includes using computers - typing, using mouse/pointers, etc.

Rightfully so, Bloom and his colleagues never created subcategories for skills in the psychomotor domain. However, since then, other educators have created their own psychomotor taxonomies.

Outcome-Based Education

The buzz word of academic world in current years, the OBE method suggests that we should concentrate on the students' ability to perform (the outcome). This has sometimes been misinterpreted as saying that the 'previous' method does not have any objective and we actually have one when using this method. Well, the 'previous' method also have its objectives - I do not think there

is anybody who wants to implement something without ANY predetermined objective. It should be looked from a different perspective.

The academic world has traditionally relied on timed written examinations as the main evaluation method. As we all know, some people do things slowly and some cannot work at all under pressure (time limits!) - but this does not mean that they cannot do the work. So, this is saying that we should acknowledge if a student can actually perform the same tasks amid being slower or requiring a more peaceful environment. In other words, we should be evaluating the students ability to actually perform a task (an outcome), rather than their ability to memorize.

Bottom line, I would say that in OBE, we should be looking for a **suitable evaluation method** for each outcome (usually an ability) rather than discussing things like course work marks contributions, or what cognitive level should a question be assigned to, or even how much time should be spent on tutorials. Then, the evaluation should REALLY reflect the students ability (the outcome) and there should not be a case where a student can get an F in circuit theory when he/she can actually perform impedance matching, or a student who get an A for C programming, but has never written a complete program in C.

SMART Objectives

Note: I wrote this a while back, just thought I should share it here. The current 'official' page for this is here.

Having to go through OBE exercises, I came across this term - which really interests me. It's an acronym that can be used as a guide when trying to set objectives or goals. They can be project objectives, company objectives, or (in my case) course objectives.

So, **SMART** objectives are:

- **S**pecific - Clear and well-defined
- **M**easurable - So that we know when it's been completed and how well it's been done
- **A**chievable - To have closure and accountability
- **R**elevant - Must be useful (e.g. part of global strategies) and within context (e.g. aligned with higher goals)
- **T**imely - Must have a projected time-line, consistent with being achievable and measurable (which stems from being specific)

Some also use `Realistic` for **R** - but I think it's redundant with achievable (from terminology point of view). Also, you can make it **SMARTER** if you can:

- **E**valuate
- **R**eevaluate

I have also just come across this. So, this guy is proposing **DUMB** objectives instead.

- **D**reamy
- **U**nrealistic
- **M**otivating
- **B**old

Some may put it differently (**D**oable, **U**nderstandable, **M**anageable & **B**eneficial), but I think that's just

trying to be as **SMART**.

Just think about it - you may show that you seem to have done a lot with **SMART** objectives, but can you really be outstanding without **DUMB** (the dreamy one... 😎) objectives?

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