Mini Workshop - Shaping a First Year Course; Applying Quality Concepts to Swim Lessons

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Abstract - **Concepts from quality literature apply in many ways to shape and improve a First Year Experience course. Process, process improvement, control charts, the hidden factory all may help to teach students to swim, not sink. Education psychology suggests taking into account student characteristics. We therefore consider the psychosocial characteristic of self-concept (self-efficacy). These issues come into play, 1) many think they know everything they need to succeed in college, 2) many, in fact have heard things (information) they must do but have never had anybody put the parts together in a functioning concept, and 3) Instructors must provide a new approach, or students will turn them off. The new approach taken here will be one highly based on quality concepts. The core concept is the hidden factory, the process is learning, the metric is grades interpreted in the language of control charts.**

Index Terms – First year course. Student success, College model.

A FIRST YEAR COURSE'S AIM (OBJECTIVE)

W. Edwards Deming in The New Economics [1] introduces a union of four points necessary if you wish to have a quality result. The first is "Appreciation of a System." A system has great complexity that we need to understand. One detail we must understand is the "Aim" of the system. The aim of a college or university, without getting into the myriad of possible qualifiers, is to produce a package of knowledge in the mind of the student that will allow the student to function in his or her major of concentration. When the package achieves a designated level of maturity, bachelor, master, or doctoral, the institution attests to the achievement of the level by issuing an inspection certificate known as a diploma. Steps along the way to a specific level, e.g., courses, also have specific aims in support of the institutional objective. Hence, it is important to consider the aim of every course we teach.

As an example, consider the aim for our first year experience course. For the two credit (one lecture and one laboratory) course I inherited and have shaped, it is twofold: to enable the student to engage rapidly in college level academics (to swim in their new natatorium), and to expose students to the nature of engineering so that they can better decide whether they truly want to pursue the major. The first part of the aim is the heavier emphasis in this workshop. It is also the emphasis of the weekly lectures. The laboratory addresses the second part.

I. Our aim's first part.

There are three types of learning [2], kinesthetic (psychomotor), cognitive, and affective. Kinesthetic relates to training the body to develop physical skills such as handwriting or riding a bicycle. Cognitive relates to intellectual knowledge, both declarative (information that can be regurgitated) and procedural (skills that can be applied such as integration and differentiation, or using a drill press). Affective relates to wisdom or making good choices and involves issues such a responsibility, values, and social awareness. Since many students coming out of the twelfth grade have received good grades without much work, have played and texted more than studied, the ultimate learning outcome sought in pursuing the first part is affective learning. To swim in college, students must make choices to do things they never did in high school.

II. Our Aim's Second Part

The second part of our aim is to enable students to make a sound choice as to whether or not to continue in engineering. While this, too, iinvolves affective learning, to make the choice first requires cognitive learning about the engineering option. Noting that much of engineering practice requires working on project teams, cognitive learning in the laboratory centers on projects (three in series) carried out by randomly selected teams. For them to do so, we introduce a basic engineering design method. We provide each with a Myers-Briggs evaluation so that they may better understand team dynamics and their own part in it. We teach oral presentation to prepare them to deliver the engineering design review required for the third project. We also train them on simpler shop machines, a number of which they must employ in their third project. We stress safety regulation and test students on them.

SHAPING A COURSE FOR OUR STUDENTS

In anticipation of ideas presented in the full workshop, we identify the students as the primary employees of a college. This identification affects approach. Any company that runs on quality principles will train its employees in the processes they must own and execute. Academic success results from the processes students apply. Hence, colleges must train their primary employees in the academic process. For the

most successful training, a company should match the training to its employees; it must know them well. Therefore, each of us involved in such training should consider the nature of our students.

What are our students' characteristics? Zook [3] suggest three grouping of characteristics that can come into play. The three are cognitive, psychosocial, and physical. We will deal with one psychosocial characteristics vis-a-vis age. There comes an age in student growth when academic self-concept (i.e., self-efficacy) may become divorced from reality. They think they know what they are doing and insist they can manage themselves. Some can, but many are unable to do so. This inability may manifest itself in their being difficult to coach. For example, a neighbor, whose daughter turned eleven, suddenly found out from her daughter that she knows nothing. Another case: I had a girlfriend in high school whose father, out of what seemed frustration, asked me to intervene to get his daughter to take her academics more seriously. Yet again, my parents had a similar problem with my brother. With grade inflation, the percentage of first year students who develop a distorted self-efficacy may be on the increase. Here is what I think this means: many first year students do not accept being told what to do. Consequently, without carefully setting the stage, we should not teach details students most likely have previously heard. Most students have heard they should read the text assigned, practice time management, take notes, etc., and we do not want to repeat what they know in the ways they have heard it before or they will shut us off immediately. We need to approach learning details in new ways, e.g., provide a new context, or flesh out detail students may never have considered, or create emotional experiences. In addition, receiving advice from peers can be helpful.

Figure 1

Figure 1 helps illustrate the situation. Students have heard about academic success practices, and probably more than once, but they are no more than fragments of a picture. They do not know how to assemble the fragments into a picture. We can set the stage, that is, give them a framework for the fragments (Figure 2), and then encourage the students to build their own picture. Once we have set the stage, we can return to particular items, not as standalone items, but as

elements fitting in a framework. The framework is new, and newness of placing things into the framework will enable
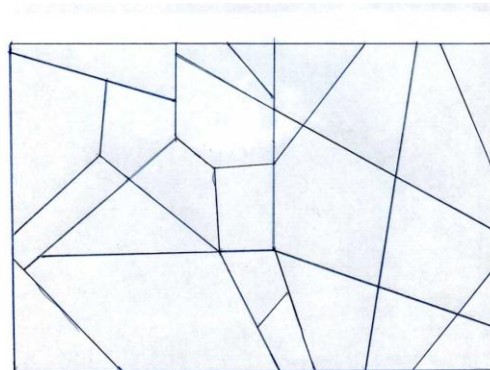

Figure 2

more students to listen. When they finish the class, students should have acquired a functional picture (Figure 3), not a perfect one, but one they can understand and know how to modify and improve in the future.

Figure 3

Another interpretation that helps our understanding of the situation with first year students comes from lines in T. S. Eliot's Choruses from the Rock [4]. The opening stanza sequentially asks these three questions.

"Where is the Life we have lost in living? Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?"

These questions poetically capture increasing entropy. I believe this is characteristic of the intellectual life of more and more students. The idea of "teaching to the test' describes the desire to be sure students can repeat the facts in order to score well. The idea of getting the information in a structure that we can describe as knowledge (or understanding) gets lost in the panic to have good test results. In addition, we observe many students immediately go to a search engine to find answers to assignments we give them. They do this before ever thinking things through. In so doing, students perpetuate dealing at the level of information. Putting this poetic image together with the idea

of providing a framework, we see our effort is to take the information (mostly familiar to our students) and raising it to a level of understanding or context. In so doing we hope, and often do, see students begin to display affective learning by making wise choices. In essence, our approach is anti-entropic. [5]

Portfolio feedback validates our approach. As examples, the first quote below supports the insight that some 17 and 18-year-old students arrive on campus with a self-concept that is out of proportion with reality. The second aligns with the interpretation of the three pictures discussed above. Together, the quotes also suggest that the approach we take works.

"I went into class on the first day [having] deemed it as "the worst class ever." Fifteen weeks later, I am walking into class excited and so thankful that I had taken this class. … I have acquired so many valuable tips for learning, studying, and surviving college."

"… I have heard most of the things that I was taught in this class prior to taking the course, but the thoughts were never fully explained to me until I had the opportunity to take the class."

I.   Setting our stage

We now turn to the stage we set in our first year course. We build our stage by applying the "hidden factory," [6] to the academic environment.   With the application, we clearly identify the "academic process" students must execute.

The part of the hidden factory we consider first is the basic thread show in Figure 4. We show this in class and
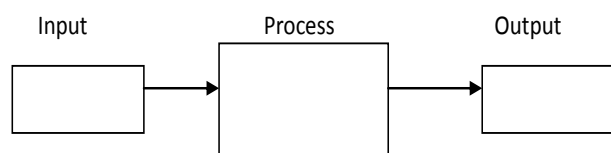

Figure 4

begin to ask students to identify the boxes. We start by asking, "What is the output or product of a college?" Seldom
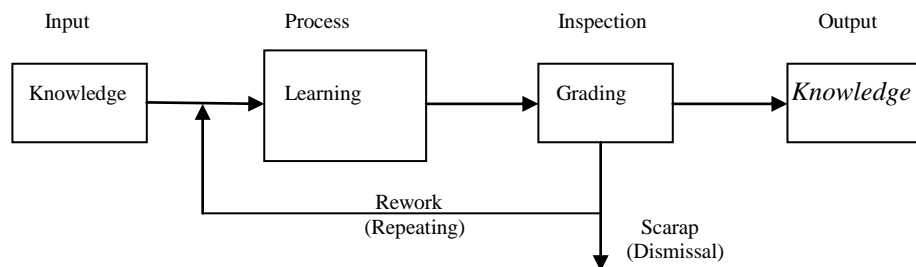
do we get the answer. Typically, students will answer, "A diploma."   We may then ask, "What does a diploma signify?"   We will arrive at "knowledge", which is acceptable and expandable to the fuller articulation found in the first paragraph after the abstract.

Next, we address "input." This could become highly detailed, but the answer sought is "knowledge." This allows us now to look at the process. It is very simple to see. It is learning. We have now arrived at Figure 5.
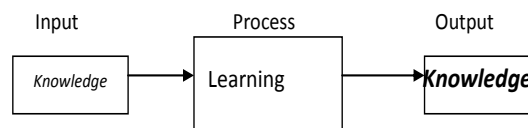

Figure 5

Learning is the academic process our primary employees must execute. Here is the core of achieving the first part of our aim. Education psychology informs us that learning is internal. Being internal, instructors cannot do it for the student. Therefore, in the college production line, the student of necessity is the primary employee. This insight establishes the student's role in the academic enterprise, and why we, if we function as a quality based institution must assure our employees understand how they fit in and what their job is..

We finally show the fuller academic interpretation of the hidden factory in Figure 6. The added features are inspection (grades) with rework (repeating courses) and scrap (dismissal).

- *Inspection (Grades):* Grades are the feedback to allow students to judge whether or not they need to improve process. Interpreting grades analogously to control charts not only gives students insight into their processes, it also helps us respond to potential student problems. This is a long discussion that students have not heard before.

- *Two Further Interpretations of Student Employment in the Hidden Factory:*

Figure 6

Many more details about swimming lessons need exploration and elaboration.. Topically, they are

II. *An Approach to Delivering Concepts*

Not only do we teach the learning process by providing a new framework or context for the details we present, the way in which we deliver the content follows certain ideas. We therefore feel we must discuss aspects of classroom delivery.

III. *Swimming Lessons Teaching the Learning Process*

Before going into academic process elements, we ask our students to take the learning style assessment by Richard Felder cited in Landis [7]. The assessment gives students print outs of their results. Wonderfully, the printouts in no way suggest any particular learning style can serve as an excuse. Since students have no excuse, we present multiple citations that emphasize taking responsibility for their own actions. The citations come from Shakespeare, Anna Russell, Jimmy Buffet, and Theodore Darymple, and personal experience.

We instruct the students on what comprises learning **fro**. This is critical. We give a mini-lecture on learning theory. We discuss the semantic network. We define learning as taking in new information, making sure to understand it, and then storing it in long-term memory in a retrievable form. This puts us in position to relate all other academic process elements to enhancing the learning process. Students have not experienced this approach before. Elements we cover include:

- **Reading:** Reading the book before class to enable greater understanding. To stick with one primary source for explanations, and not hopping around the Internet.

- **Time Management**

- **Note Taking**

- **Process element not normally considered**: 1) Sleep: The aspect of REM learning, and the necessity to not be cavalier about it, 2) Diet**:** Aid in staying awake, and 3)

Exercise: Stay in shape to be ready for overload (not to survive cramming)

- **Miscellaneous:** Sources describing academic process elements are book, lectures and peers. We hand out a "Catalog of Academic Process Elements" produced by assembling peer-generated descriptions.

ADDED COMMENTS

We require each student to submit a "showcase portfolio at the end of the semester. These documents inform us if affective learning has taken place. The summary section will be where students discuss intent to stay in or leave engineering. In the summary section, or in the academic success strategies section we gain feedback on affective learning. It is an observable fact, that whereas you would expect the poorer student to need the most process improvement and therefore reveal the most affective learning, it is the better students who do so. Another observation is that we find that upper class students echo what we present when interacting with subsequent first year students. We welcome the repetition upper class voices provide. Repetition helps learning.

A third observation: we expose our first our students to concepts of quality. This exposure should beneficial when they graduate and enter the work force.

REFERENCES

[1] Deming, W. Edwards, *The New Economics*, 1994

[2] Landis, Raymond, B., *Studying Engineering: A Road Map to a Rewarding Career*, 2007 pp. 115 – 118.

[3] Kevin B. Zook, *Instructional Design for Classroom Teaching and Learning*, 2001

[4] Eliot, T., S., "Choruses m the Rock", *T. S. Eliot: Collected Poems, 1909-1962 p. 149*

[5] N. Wiener, *Human Use of Human Being: Cybernetics and Society*, (1988), I believe a comparable idea of scholarship resides in notions offered in this text, where creation and requisite communication emerge as "anti-entropic"

[6] Gygi, Craig, et al., *Six Sigma for Dummies*, 2005 pp. 130 – 131

[7] Landis, *loc. cit.* , p 119