So, How is Your Change IQ?
The Dance of Change and Adaptation
(The reality of college life—
How to know it, learn in it, and play in it)

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Introduction and Motivation

For years at the freshman level we have tried to make sure we cover the necessities for the students to have a good starting background. Programs are designed to provide the best first year, make the best impression, teach the friendliest, and encourage the students to stay in the university. The goal is to help them be strong, be successful, and be the best they can be.

In many engineering programs, instructors try to teach the fundamentals, to expose the students to what the field is about, and in addition the students are also exposed to ideas of time management, best study habits, best test-taking habits, and best reporting practices. The idea is to expose the freshman students to all we can to make their university experience a successful one. In the electrical and computer engineering program at Iowa State University, we have two required classes for the first term—one is engineering problem solving and the other a freshman student orientation. In one class the issues of problem-solving tools, methods, etc. are discussed, and in the other class we teach them issues regarding the rules and ways of the university. After a few years of experience, we also started to cover concepts like the way to study, the way to manage time, the way to do team work, the way to do research, and even the way to take classes and be successful. These are efforts based on long-term observation and

very detailed study. In general they are very useful and successful and have proven valuable to all the students.

However, there seems to be a great deal missing. We see more than a few bright students who are coming to the university with successful high school years and a reasonably good performance on high school tests who do not seem to be successful in the university. In many cases, these students can repeat capaciously what is taught to them in the freshman engineering classes, and they can tell us all the points that we present on time management, on the way to study, etc.; however, they just do not perform well in the overall university classes. They seem to study many hours, do the problems, review all of the homework and examples, but still not do well on the tests.

There are many “good” students who do what we tell them to do. They do their homework, spend hours on the class material, and, though struggling, never give up; however, at the end of the term they do not seem to really fit in the system. In our opinion, this group suffers from habits that do not help them to be self learners.

In addition we also see some students who, while they are almost graduating with reasonable grades after 4 or 5 years, still are not self learners—they do not know the basis of how to learn on their own and how to maximize their learning in a class. In most cases these students are very teacher dependent, and they seem to do well with teachers they call good and poorly with the not-so-good teachers.

If we are trying to make our university students learner centric, self learners who engage in discovery and life-long learning, then why have we not been successful with such groups? After a long observation of these individuals, we believe that these are individuals who have not shown successful adaptation to the real university environment. Our experience after careful observation of a number of student groups and types shows that a good start at the university level is necessary, and success of the students depends on how well they adapt to the ever-demanding requirements in the dynamic and diverse university environment.

The CHANGE and the need for adaptation to the new environment is what is most forcibly felt in the first term of university life and continues thereafter. Students who can adapt—change to the

mental and practical shapes that the university classes and programs demand—will be successful.

Students who do not adapt as well can also be successful. There are numerous examples of students living within the university system, getting used to what is demanded but never feeling the natural tendencies of the system. This can be as many as half of the students—those who do reasonably well in the system based on static tests that are given in the classes. However, many of them have a large amount of self-exploring after they graduate from the university.

What Can Be Done?

After carefully observing and investigating the students' behavior, it seems the main issues that the students need to learn are what change is, how to handle change, and how their individual systems deal with change. Perhaps we need to actively help them realize that in the dynamic setting such as a university, the most predictable issue is the constant demand for change. Things change—classes change, and classes demand students to change their habits, their learning, their thinking, and sometimes their ways of going about life. This is the most difficult issue that the students need to deal with. They need to know and realize the major issues of change that are facing them. For example, being away from their families (for most of them) is a huge burden that imposes great changes on their lives. In addition, the pace, demand, and expectation for a typical university class is a huge change for almost all of the students.

We believe that by systematically helping the student identify the major issues of change, helping them understand what change is, helping them see why it is difficult to change and adapt, and helping them understand how/why people react to these changes, we would be doing the best for our students. We believe this is the awareness that needs to be actively integrated into the program to help many of the students have a more fruitful learning experience in the university. While this is a process for their whole lives, we believe by integrating the issues of change and adaptation in the early freshman classes we will have a better chance of helping them have successful lives as life-long learners.

Consequently, we believe we need to start with the freshman classes. Starting with the second week, we need to incorporate the concepts, issues, and ideas of change, the major dance of change that they need to engage in the university setting. To be useful we believe that each student needs to know what major changes are needed from them, how other people have

handled those changes, how their own systems handle change, and what they can do to help the transition for their own case.

We should note that such issues for learning organizations have been discussed by people like Peter Senge.[3] However, in our context it is on a personal level for each student. The major item to deal with is how to introduce the ideas and how to help the students change and understand the requirements. In particular, we need to make sure that we do not require too much change too fast. We need to help students know their personal change-receptivity—they need to understand who they are and how much they can do.

Some Concerns

Before one is ready to change the available system with an academic setting, perhaps we need to address all or some of the following questions:

1) Determine academic institution's need for change
2) Define students who are successful in "actualizing" (ready to change, embrace learning, accept self, and willing to take risks)
3) Determine how do we measure that
4) Evaluate the differences or factors
5) Describe the "adapting to change hypothesis"
6) Ways to influence students to adaptation skills
    a. Change theory
    b. Environmental theory
    c. Learning styles
    d. Case studies
    e. Peer report
    f. Self reflection
        i. Written
        ii. Discussion
        iii. Thinking
7) Assess the amount of change (success) from #6

Our ultimate goal is to identify a quotient of adaptation for each student. We should note that this is more or less a psychometric measurement. One would think that such items are

available through IQ tests. However, such a quotient isnot found there. What we are trying to measure is, more or less, close to the original ideas that psychologists had about intelligent quotients. Generally speaking, the IQ is a measure of what a person's capabilities are at the time of testing. It has been proven that the IQ does not change much and is a set measure based on environmental, genetic, and other influences.[4] We believe that the adaptation quotient is a measure of a person's current capabilities to go through the required changes to cope with a given situation. While this also has an affinity with what is traditionally called IQ, we do not believe it is the same. Currently, we are in the process of identifying some way to measure this quotient.

Early Implementation

Perhaps another challenge is how to implement the ideas into the program. One way is to talk about case studies of individual students—how they have changed, why people do not change, and what the typical approaches are.

We should note that what we are proposing is a process that is generally speaking too big for practical implementation. Meanwhile, the concepts and ideas are important, and they are complementary to the process of learning (this is emphasized in the problem-solving class), the process of understanding how we learn (which is emphasized in our orientation classes), and the process of becoming life-long learners. Consequently, at least we need to implement the concepts—the process that makes the students think about the required change and their reactions, approach, and adaptability to change.

Based on the above, perhaps the easiest way to implement change is to emphasize a few major steps in the process. The following is also in close accordance with the ideas of Carl Rogers on how people become aware and becoming increasingly self actualized.

Step 1: Identification of the required change in the university setup

The teacher introduces and opens up a discussion about what has changed since high school, etc. The teacher allows students to reflect on what they are going through and also identify that there is a need to accept and/or be proactive and positive about the required changes.

Step 2: Identification of the demand for change by the environment is a nature of this new setting (student self reflection and perspective)

At this stage, students will need to understand that not only their colleagues in the same classes but all of the people who have gone to the university have seen/felt the need for change. Perhaps the teacher, TAs, and others can talk about some of the stories and how the students coped with change, so the students realize that we all actively decide to adapt to the new situations. At this point the teacher can also reflect on the idea that the required adaptation is a part of life, which means we all need to learn it.

Step 3: Overview of the steps that we need to go through to identify/work on changes that are required; what "openness to experience" means in particular will need to be addressed

Step 4: Self identification and knowing who they are, that they can "trust in themselves," and what is so special about each of them

Each person would need to know their typically nice characteristics as well as their vulnerable characteristics when facing change. They need to realize their own power to make the adaptation possible.

Step 5: Internal evaluation—how we evaluate how we are doing and what signs are good and not-so-good behavior

Based on knowing their needs and characteristics, the students need to come up with a couple of strategies so that they can cope and adapt to the needed situation. Then they need to try the methods and choose the ones that work best for them.

Step 6: The circle of change–how we make this process an on-going one to help us in life

Finally the students need to realize that they need to go through the above cycle many times.

Evaluation and Measurement Issues

It is even more difficult to evaluate a student's adaptation/change quotient than to teach them how to improve their change comfort level. While many books are written on how to work with

organizations, management, and institutional changes, very few to no books are written on how to measure an individual tolerance level for change or adaptation characteristics. This seems to be one of the newest trends in psychometric studies. There are very few studies on the subject and many of them show high sensitivity to the subject's (student's) awareness. It seems that once the subject/student understands the general trends of questions that are meant to measure their change/adaptation quotient, they can interfere with the measurement by trying to answer what the researcher wants to hear (in the subject's opinion) rather than what they really feel about the question.

Conclusion

We believe that there is a need to make the students in the freshman engineering classes be aware of the constant demand for adaptation on their part in the university. The need to be aware of the fact that one of the issues for becoming successful in their program is how they can adapt to this never-ending requirement. Their susceptibilities and adaptation capabilities to the ever-changing, diverse demands of the university setting and later to the professional and social environment can be a major contributor to their success. We believe that by actively addressing the steps one takes to make a change in their habits, thought, and approaches will make them aware of their particular characteristics and help them adapt better to the next demand. In order to help the student, we are proposing a set of tests and questionnaires to identify the current students' quotient of adaptability. With proper active engagement and perseverance, one may be able to improve their quotient. We are currently in the process of designing the first set of tests.

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