ChE classroom

CAN AN ENGINEER BE ACTUALIZED?

A Senior Seminar Course

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"CAN AN ENGINEER be actualized?" This is a question that I have been asking our students in chemical engineering here at the University of Florida for the last three years. No, I haven't gotten a clear and concise answer to the question. You may ask, why even ask it. Why is it important? Particularly, why is it important to me?

The question, I believe, for me as a chemical engineer, has been very important; although I didn't know enough to ask the question when I should have. I worked for a chemical company for seven years after graduating from the University of Michigan in 1951. My first supervisor in that chemical company, a production supervisor, was very much unaware of the characteristics of actualization. As a result, I found myself aching for some honest sharing, and maybe I should say caring feedback concerning my own interaction and productivity in that particular company. I worked with this individual for four years. And really, during that total period of time I never did have any positive, constructive view of my value to the company. If I was doing anything really all right, I never knew it. I now look back at my experience there as a positive one. I learned much, and I think I was a productive engineer. However, I do remember having an aching gut almost every spring when I was working for this company. I believe part of that ache resulted from my lack of knowledge of myself, and, particularly, from the interaction or lack of it with my own supervisor.

After leaving the chemical company to go back to school to obtain a Ph.D., I then joined one of the national laboratories. In that particular organization, much freedom was given to each of the staff members and much of the productivity of that organization resulted from the grass root ideas and the involvement of each staff member, even though he or she did not have an official title. Unfortunately, I did not realize that my responsibility was to dive in, to let people know where I stood, to let them know what ideas I had and how they should be expedited. Initially, I went back into my little corner, utilizing my new tools obtained in the Ph.D. program, ran the computer, worked with my mathematics, and did not productively contribute to the guidance and sense of direction of the organization. Finally, after about three years of this type of non-involvement, I suddenly became very aware of my potential to the group and to myself. Fortunately, I did turn around and did start to contribute aggressively at every level that was reasonable.

Can the engineer move out of Consciousness I and Consciousness II and still maintain the high level of productivity and creativity that is necessary in our very technologically oriented society of today?

I've shared with you these two experiences in my own engineering past to give emphasis to my own strong belief that we, as engineers, do need to have some of the characteristics of actualization to be more effective and to enjoy more positively the engineering experience. My own experience in industry has indicated that much of the actualized characteristics are not there among the engineering community. Maybe I should ask why. More important, I should ask, what can we do about increasing the level of actualization, the level of positive interaction that we as engineers can produce in our industrial environment.

CHARACTERISTICS OF ACTUALIZATION

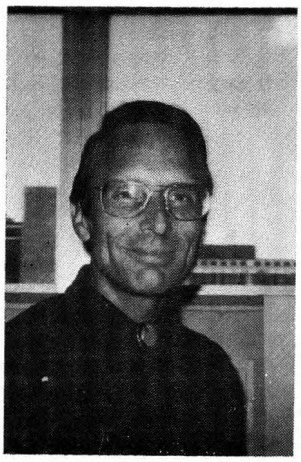
ABRAHAM MASLOW INTRODUCED his ideas of actualization in the mid-fifties, and they have had considerable impact through the

humanistic psychologist upon many of us and also upon industrial management. I feel that there are certain ones of the characteristics of the actualized person that are very meaningful to me, and they are the ones that I would like to emphasize during this presentation. Dr. Maslow discovered in his group of actualized people he studied that they seemed to have certain common characteristics. They seemed to center around words such as honesty, awareness, trust, and openness. I will not try to describe in great detail these terms. Dr. Maslow's books are there to be read, as are others who have utilized his ideas and concepts. But the feeling that I obtained from his works is one of being free, of being very aware of oneself and the human process going on around ourselves, of trusting our own capabilities, and trusting what we do detect in this process, and finally being very open in what we feel and what we would like to express to those about us. The terms "sharing" and "feedback" come to be an important part of this openness, trust, awareness, and honesty. The sharing is sharing of ourselves, of our deep feelings inside. As Jess Lair has said so appropriately in *I Ain't Much, Baby—But I'm All I've Got,* the loving process to him is one of deep sharing. I think that I agree. Also, the actualized person tends to be very much "here and now" oriented. Again, the awareness seems to center on the now. The excitement of the moment stands out. Finally he is process-oriented. The goal, many times, tends to be much less important than the process that heads toward that goal. As a matter of fact, he can brighten the day or brighten the moment in the midst of a very hectic time by making the here and now, the momentary process very delightful and very enjoyable.

ENGINEERS' CHARACTERISTICS

TO ACTUALLY CATEGORIZE the engineer and state his characteristics is a very dangerous process. He obviously is a very talented person, has been very creative in the technological sense, and is a very stable person in the community. I believe the divorce statistics indicate that the engineer has one of the lowest divorce rates among any of the professional groups. He makes a good husband.

However, if you ask the average student on campus about the engineers on campus, we will be viewed as to being quite "square", very dedicated to our books, very non-participative in activities on campus, maybe quite unaware of the human process.



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In the class seminar I am about to describe, we utilize *Greening of America* by Charles Reich to give us some awareness of the types of people with whom we interact. He has arbitrarily broken down society into three groups, and he calls them Consciousness I, II, and III. In brief, Consciousness I includes those people who are very self-reliant, do not lean on others at all. They feel they can do it alone. The pioneer, who was willing to hack out an open plot of land in a thick forest many miles away from the nearest neighborhood, undoubtedly is very characteristic of Consciousness I.

Consciousness II is the group which has become convinced that the large organization, whether it be large government, or large union, or large industrial corporations, is very necessary in solving all of the problems of society. If there is a problem that exists, the way to solve it is to create another large organization, or another large committee, or another counteracting force to balance those that are existing in the society. The characteristic of the Consciousness II person is that he is a very willing worker, and also a very willing consumer. He is very status-conscious; salary is very important; grades are very important. His

position among the hierarchy is important. He works hard all week mainly to get away on the weekends so that he can go off to his cabin, or the ocean, or to some recreational area that can be totally separated from his work. Many times the work is very unsatisfactory, and his only reason for pursuing his particular profession is to generate money so that the weekends and particularly his vacations can become more meaningful.

Consciousness III is a more difficult group to describe. The group is more human-oriented, tends to care about the human beings around, is very aware of the human process. Goals, particularly monetary and status goals, are relatively unimportant. Many of the characteristics of Consciousness II have been rejected by Consciousness III. In some respects, the Consciousness III person might be described as being actualized. However, I believe the one-to-one relationship is not totally there.

Charles Reich likes to describe the "hippie" of the mid-sixties as being the characteristic person of Consciousness III—the long hair, the flowing clothes, maybe even the use of drugs. Therefore, by definition, Consciousness III is out of bounds for the "square" engineer—or is he out of bounds for the engineer? I guess the question I like to pursue is, "Are there characteristics of Consciousness III that can be nicely integrated into the intense work regimen of the engineer that can invigorate and enliven his own professional consciousness?"

From my own view, I feel that the engineer generally sits in Consciousness I and II. I have personally worked with engineers who are so independent they will not even say hello in the hall as they walk along. There are others who are very much involved in the work and play schism, as indicated in Consciousness II. Also, many of the engineers become quite subservient to the overall process of industrial involvement of the organization, become very aware of their very tenuous state that they seem perilously to maintain in a given organization. Yes, the question, I think can be rightly asked: can the engineer move out of Consciousness I and Consciousness II and take on some of the characteristics of Consciousness III and still maintain the high level of productivity and creativity that is necessary in our very technologically oriented society of today?

In the senior seminar, we concentrate for a while on role playing situations that help in these overall processes. Our students have been criticized before for not handling themselves very well at interviews, and, therefore, we are utilizing the interview process for our role playing situation.

BREAKING OUT OF THE MOLD

IF WE REALLY WANT TO break out of the Consciousness I or II mold, what can we do? The first question is, "Do we really want to break out?" In reading Abraham Maslow's work and also that of Everett Shostrum, I get a thrill and a feeling of, "gee, wouldn't it be nice to have some of the thrill of life that the actualized individual seems to have! His openness, his honesty, his awareness. His feedback and sharing seem to be delightful things to use and participate in." Also, another aspect of the actualized process is that of being dedicated to the growth of the other person, or maybe to a vibrant idea.

This dedication to growth has been expressed very nicely in a book by Milton Mayeroff, the title being *On Caring* which came out in 1971 and is published in Perennial Library in paperback. In that book, he states that the caring process is one of dedicating yourself to the growth of the other person or to an idea or process. To me, this view makes a lot of sense. The growth of one's wife is necessary if the relationship continues to be a vibrant one. Therefore, dedicating some of my efforts to her growth certainly is to me a loving and caring process. In the management field, the best managers, I feel, are those who are dedicated to the growth of the people they manage. They are aware of their needs, and they create an environment which contributes to the growth of these people.

How do we move from one growth level to another? Growth occurs slowly. I am sure that the reading we've done and can do is an important part. We need places to practice, however, the actualized process, even to be aware of what it might entail. My own feeling is group work, group

dynamics, being aware of the dynamics, is a very important part of this growth process. An associate of mine the other day stated that it takes time for one to become what he philosophically states when a change of philosophy has occurred. He indicates that maybe five years are required before a person can really assimilate and be what his philosophy tends to dictate. This is a very saddening realization, because even though I want to be actualized; even though I want to be aware, even though I want to be honest and open, I cannot do it immediately today. I must practice, I must work, I must read, I must utilize the process in everyday life, in maybe artificial situations such as group activity, to be able to make it a part of me.

SENIOR SEMINAR

THE ABOVE STATEMENTS concerning actualization and the possible benefits of trying to be aware of it and the utilization of it as an engineer have been the motivating force behind my presentation and involvement in a senior seminar for our chemical engineering students at the University of Florida. The course meets once a week, is one hour credit, and is totally dedicated at the moment to the study of humanistic processes and the involvement of the engineer in those processes. We utilize *Greening of America* by Reich, *Man, the Manipulator* by Shostrum, *On Caring* by Mayeroff, and *I Ain't Much, Baby—But I'm All I've Got* by Jess Lair as the textbooks in this course. The texts are nowhere near as important, however, as what goes on in the course itself. The group dynamics, the interaction, the sharing, the caring and feedback processes are very important to try, to risk a little, to get the feel of what can and cannot be done.

My own feeling about group work is that it best occurs when it is done in a caring way. The so-called encounter group totally turns me off. I don't like the antagonism and the non-caring that can go on in the so-called encounters. However, the sharing group or the support group can do much to enhance the characteristics of honesty, awareness, trust, and openness we would like to see developed in the members of the group.

In the senior seminar, we concentrate for a while on role playing situations that help in these overall processes. Our students have been criticized before for not handling themselves very well at interviews, and, therefore, we are utilizing the interview process for our role playing situation. I ask the students to go over to the Placement Center and investigate a given company very thoroughly. A team of two students then will put on an interview for the rest of the group, and actually for themselves. One will be the interviewer and the other the interviewee, and they will go through the total interview as best they envision it. The role playing has many advantages. They do obtain some practice in interviewing. Also, they become aware, with the assistance of the group, of their own participation in that interview, of their own body language, their eye contact, their nervousness or lack of nervousness, their interest or lack of interest in the process. They can be made aware of their manipulative behaviors, if they happen to take on any of the top dog or underdog characteristics as indicated by Shostrum. The interview, as we are all aware, can be very manipulative. It should be one of generating useful information for both participants, and I try to emphasize that the student should make it as non-manipulative as possible. This is a case for openness and being candid, of trying to make the interview useful for learning about the company he is investigating. He should not allow himself to be manipulated, if manipulation starts. All in all, the interviews tend to be quite exciting, and sometimes they are so well done that the students lose themselves in that process and really are totally unaware of the group that is looking on.

The feedback session after the interview also is very worthwhile. We obtain practice in giving feedback, and giving it in a way that can be accepted by the recipient. In many cases, the feedback has to be relatively negative. How can the negative comments be couched in a way that they can be accepted, and then how can the person receiving the feedback accept it in a way so that his self-image is not totally destroyed. We, of course, in the industrial setting have to face this situation time and time again. In actuality, when it comes to employee evaluations particularly, the overall situation may totally be avoided by the supervisor who is not willing to involve himself in sharing and feedback, in honesty, which are necessary to facilitate the evaluation process.

Another aspect of the group dynamics and group interaction that can occur in the seminar is the practice that can be obtained in sharing of one's deepest feelings. This sharing is a very difficult process. However, again, practice does help in making it an important part of our behavior.

RESULTS OF BEING ACTUALIZED

THE STUDENTS IN OUR SENIOR seminar in chemical engineering have not come to any conclusion as to whether the engineer working in our society, and usually for an employer, can be fully actualized, can be a member of Group III, and still be productive. For instance, we discussed recently, the paper Dr. Ray Fahien and I presented at the American Society for Engineering Education Annual Conference in 1973 which was titled "Should Engineering Students Be Taught to Blow the Whistle on Industry?"* In that paper, we discussed the hierarchy of values—extrinsic, systemic, and intrinsic values—and we suggested that, depending upon the type of question being viewed, the engineer might take different actions, both internally in and external to the company. Our group became very aware in the discussion of the paper that to take any action at all requires a great degree of self-confidence in the engineer, a high degree of awareness, and certainly a great feeling of being open and wanting to express honesty. These, of course, are the characteristics of the actualized person. They, also, expressed a great fear in taking the risks that are necessary to be actualized. They felt their jobs might be in jeopardy, and that the Group II values, such as a sumptuous home, a boat, two or three cars, and a house or lot in the country, might be jeopardized if the person actually did behave in a fully actualized way. I believe the group in this discussion the other day was not very hopeful that the engineer, as they viewed themselves and as they viewed other engineers, could actually interact with industry in this manner.

I guess my own view of the situation is much more hopeful. I believe that the risks can be taken, and that the risk can be taken and still productivity can result. As a matter of fact, maybe more useful productivity can result than if the engineer is very passive and a very willing participant of the system, not questioning its sense of direction, both technical and ethical. I may be somewhat naive in my point of view, but I tend to feel that the feelings of Group III consciousness are growing and that they may become a more noticeable part of the large governmental, industrial system in which we are now involved.

In the discussion that followed the presentation of this paper on "Whistle Blowing" at the Annual Conference in Ames, Iowa, the participants there felt very similarly to the members of my senior group—that the action necessary actually to blow the whistle on industry would seldom occur. However, at least one member of the audience indicated that if a higher percentage of us were willing to risk, then that percentage would tend to grow. So it means if we, as engineers, are to be actualized and are to actually express our feelings and try to influence the sense of direction of an organization, we will have to take the risks pretty much alone. But, if we so do, there is a good chance that others will finally risk with us.

What I am suggesting is that the actualized engineer is a possibility, and that productivity and the excitement from that productivity may well increase if we have more of us who actually have actualized characteristics. The risks are not trivial in speaking out, in being honest, and being aware of our human situation. But my own feeling is that these risks are worth taking, and they make the job itself very exciting.

RESULTS OF THE SEMINAR

WHAT DO I THINK the results of such a seminar as we are conducting in chemical engineering might be? I certainly do not want to delude myself in thinking the students in this class will go out and take the risks necessary to be totally actualized. However, I am sure many of them will now be much more aware of their role in industry and the fact that they do have an obligation to let their views be felt. I do hope that their awareness of their interaction in the company is heightened, and that their ability to speak up, particularly in the technical sense, is increased. Also, they can become better supervisors by being again very aware of the human process about them, aware of the needs of the people they are supervising, and then being able to take again the risks that are necessary to make the human process within their group a vital one. Yes, I do feel our engineers can have many of the characteristics of the actualized individual as postulated by Maslow. And, for those of you who are in the industrial community or even in the academic community, I hope we have the pleasure of interacting more frequently with an actualized engineer. □

*"Should Engineering Students Be Taught to Blow the Whistle on Industry" was presented by John Biery and Ray Fahien at ASEE 1973 Annual Conference in Ames, Iowa. and was published in the Fall 1975 issue of *CEE*.