

"BREAKING DOWN BARRIERS"
VANDERBILT UNIVERSITY MINORITY/WOMEN ENGINEERING PROGRAMS

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Good Morning Ladies and Gentleman, I am Carolyn Ruth A. Williams, Assistant Dean for Minority Affairs/Women Engineering and I bring you greetings from Vanderbilt University School of Engineering.

I would like to take this opportunity to welcome you to this session on "How To Start A Program". I hope you will find this session informative. First we will have all presenters present their presentations and then we will have discussion and answer questions that you may have.

Today, I want to give you some background about the state of minorities in this country, engineering schools and education in general. I also want to talk about our minority and women's engineering programs at Vanderbilt and tell you about some of the things we're doing. I'm proud to say we have the best minority engineering program in the country.

Finally, I want to give you some ideas where I think we're going, what we need to do, and some specific things we as educators can do to get ourselves out of the sorry mess. Because the bottom line is we in this country are going to lose our competitive edge if we don't train minorities/women in the sciences and engineering; which are the workforce of the future.

The number of science engineering degrees each year is declining as Betty Vetter in her presentation yesterday stated. This year a nation survey showed a decline in the number of students planning to major in science and engineering compared to 1982 freshmen. Already our engineering schools are filling the drop in enrollment. It's not going to get better because Engineering is not a popular major.

By the year 2,000, over one third of the population of this country will be according to our keynote speakers and data ethnic/racial minorities (Black, Hispanic and Asian).

Seventy-five percent of the new entrants into our workforce will be women and ethnic minorities.

These changing demographics mean that the survival and success of this country's educational institutions in the 90's and beyond will depend on their ability or inability to understand and meet the needs of an ever-increasing, multi-ethnic, multicultural and multi-racial population.

Women and minorities are still underrepresented in college faculties, looking at the statistics that Betty Vetter showed yesterday in her session the problem is grim, but the time according to one author has never been better to address it. I believe we can create a process for change through awareness, knowledge and skills.

And I'm not the only one. According to action agenda of the Women In Engineering Task Force, in May of 1989, the most pressing action needed to increase women in engineering was to raise the sense of urgency. It was agreed that the focus must not be affirmative action, but on the value of women in meeting the nation's technical personnel needs. You can pick up a copy of this report here in the conference resource room.

Many universities are taking initiatives to lure more women to their engineering schools. But we've got to start working with students long before they get ready for college. The sad truth is the failure to become literate in mathematics and science is not randomly distributed across the student population. Blacks, Hispanics and females are disproportionately clustered at the low end of the achievement continuum.

In a recent survey female students described their high school counselors as unsupportive and negative of their decisions to pursue a career in engineering and complained that they have very few female role models in college. Pressures from authority figures many of whom discourage females from pursuing an engineering career. Tracking - separating students in ability groups. Scant scholarship funds. History of no tradition of strong recruitment and retention of females/ minorities. Media misleading portrayal of engineers as nerds. Discouragement from male chauvinist faculties. All these factors contribute to the underrepresentation of women and minorities in engineering.

The survey of 1,945 female undergraduates who are members of the Society of Women Engineers was completed last spring by Cooper Union, an institution with schools of Engineering, Art and Architecture and a wide range of minority students. Forty three percent of the women said their high school counselors had applauded their decision to pursue engineering. Although 87 percent of the students described their college environment as supportive or somewhat supportive just 18 percent said they knew a sympathetic engineering faculty member with whom they could talk a problem.

About 80 percent of the students said they wished more of their college professors were females. But only six percent of the undergraduate women said they planned to pursue academic careers themselves. (The Chronicle of Higher Education, Nov 29, 1989.

The importance of minority and women faculty is well documented. There is a statistical relationship between Blacks and women on campus and success of Black Women, according to Reginald Wilson, of The American Council of Education. (The Chronicle of Higher Education, 11/29/89). So why is progress slow? There are several reasons, simply put the toughest barriers are the faculty of these schools who tend to hire those who fit their own mold and research interest. Also, a good role model is hard to find.

But in the final result, it's all a matter of commitment. Any program that is successful in a university is attached to the Chancellor's/President's or the Dean's Office---especially in science, math and engineering. Colleges must begin immediately tearing down these barriers and getting faculty to understand that we can't be an excellent institution without a diverse student body and faculty (U.S.A. Today 12/26/89, pp 1-2).

Unless schools change radically young women and minorities will be locked out of these jobs that could provide them and their families a better way of life and help us as a country get back our competitive edge.

Vanderbilt University, School of Engineering is the oldest and largest private engineering school in the South. Established in 1879, the School has 1,060 undergraduates, 270 graduate students in seven departments. Currently, 23% the students in the Engineering School are women 11% are minority and 5.1/2% of the freshmen class is from some ethnic background.

The School has a history of promoting women and minorities in engineering. The school has a large population of women. According to Dean Sanderlin order for women to get into Vanderbilt they came through engineering then transferred to the School of Arts and Sciences. Some women enjoyed engineering so much they stayed. Also, Dean Lewis former Dean of the Engineering School was a strong advocate for women in engineering. During his tenure as Dean Women were encouraged to pursue engineering as a result the School has a tradition of promoting women in engineering.

At Vanderbilt we're proud to have the number one minority/women engineering program in the country. We know that academic advising is a must for improving retention and for effectively increasing student's self esteem--not to mention giving them a sense of where their college career is going. Freshman year is very critical and a large percentage of students drop out of school during this time. We have a Buddy System at Vanderbilt. Each student has a big brother and sister and this helps give them a built in support system that is invaluable.

Our Women's Program has a history of helping students. We know that this is a time when students need a lot of support in their careers.

Counseling is the major foundation of retention. At Vanderbilt we conduct motivational counseling, clarification of student's goals, relationships, counseling, and even help with personal and financial problems.

Early warning prediction and monitoring can reduce attrition, but this involves close cooperation of faculty. Faculty often call me up and say Joe or Mary are not doing well in my course would you talk to him/her. At Vanderbilt those students on probation are closely monitored. They must report to me every week about what is happening with them. This kind of monitoring has been very successful. It consumes a lot of time, but it is worth it, and it pays off. Our retention rate is high in the 90% percentile.

Studies have shown that on-campus housing, including residence halls, improve student retention. About ninety percent of Vanderbilt's students live on campus.

Meaningful activities contribute to students success in a school., Minority engineering organizations provide students the opportunity to develop their organization, leadership, interpersonal and communication skills. I am the advisor of the Society of Women Engineers and the National Society of Black Engineers and Minority Pre-Med Society at Vanderbilt.

These organizations are an important part of the Minority/Women Engineering Program. I help in the planning of program activities and suggesting activities that are meaningful and that can re-ignite students intellectually. Vanderbilt's chapter of The Society of Women Engineers and National Society of Black Engineers are extremely active, meeting on campus every other week and sponsoring and co-sponsoring various activities such as "Evening With Industry" which gives students an opportunity to meet and talk with representatives who hire students; "High School Day" introduces students interested in math, science and engineering.

Although my school doesn't have cooperative education. This kind of program can enhance recruitment and retention of students. This kind of program requires active participation and involvement of students, school and employer. It also offers wonderful opportunities for career exploration, different perspectives.

With these changing demographics and the fact that lots of students are returning to school who are older and women who are single parent and support families. Cooperative Education would be a wonderful way to attract and retain women and minority students. Engineering schools that do not have a cooperative education program need to rethink their curriculum and implement such programs for the 90's.

I want to point out here that the minority/women engineering program at Vanderbilt has often been at the forefront of innovation.

Vanderbilt has a Dual Degree Program in Science and Engineering with Fisk University. We're one of the first in the country to do that. This is a five year course of study designed to increase the number of minority/women engineers. The students selects one of the engineering school disciplines of his/her interests. Participants in the program are assigned advisors on both campuses. I work closely with students in planning a course of study which optimizes and facilitates the process of obtaining two degrees.

Academic support comes at Vanderbilt through the minority tutorial program for both individual and small group counseling at no cost to students. students are tutored by faculty who volunteer their time. Thus students receive tutoring from skilled and trained professionals in Calculus, Computer Science, Physics, Chemistry, EE courses, etc. Students meet with tutors as often as needed. My only requirement is that once they start going to tutoring they can not stop until the semester ends. What is also critical is a tutoring program designed for faculty and student interaction; and we have this because

we let our faculty and TA's tutor. Faculty spend a minimum of 3 hours a week. My Dean wants me to expand this program. This type of tutorial program helps students solve problems and enhances their personal and professional development.

Significant improvements in retention rates have been achieved by institutions that focus on orientation as a retention strategy. Vanderbilt's Minority Engineering Summer Research Program is a five week summer program sponsored in part by several industrial companies. The program was started in 1976 to help high school seniors get a head start in their studies by exposing them to different specialities, teaching them to cope with stress and giving them a preview of academic life. This program is extremely successful and facilitates students in their transition to college. Preparing them for the academic rigors of an engineering curriculum. The program encourages motivates and gives students challenging hands on experience in Research. One former student told me he "did his freshman year in a summer versus the whole year". This is a good recruitment and retention tool. This coming July 8, 1990 will mark the 12th year of the Summer Program's existence.

Colleges that redesign policies and procedures for the purpose of improving student retention show significant improvement in their retention rates.

Literally anything we can do to improve the climate and environment for learning and for encouragement of all students will help. For example, strategic personnel and their offices should be easily accessible to students.

Financial Aid is of utmost importance, and we do everything we can to help our students pay for their education.

How retention is carried out with the faculty, staff, and students of a school depends on an analysis of attitudes and relationships within the school. Knowing what works at other institutions and under what conditions can be very helpful. The things that I do at Vanderbilt are tailor-made for Vanderbilt School of Engineering students. I would not do them at Cornell University, Northwestern University or MIT where I just spent a week in an informational seminar course, because the situation and resources are different. But since coming to Vanderbilt I have taken this from Cornell and that from Northwestern and Harvard and tailor made a program at Vanderbilt.

We've come a long way in the past few years at Vanderbilt and we still have a ways to go.

We're killing our schools by refusing to change. We must prepare students for a different world. This means get with the faculty and grind them down. Make them change.

Finally, we can not continue to window dress our schools. We must put women and minorities in prominent positions and rev up recruitment and utilize the alums to find out where you went wrong and what you did right.

We must also strengthen students participation in societies like The Society of Women Engineers, NSBE, and get to students early at the pipeline.

We need to find out what companies need and what organizations they support on campus. The companies need to tell us what they want so we can prepare students to work for them. If the companies are supporting school that don't have an engineering program for women and minorities, they're throwing away their money. It's time to wake up. The work force is changing. As engineering schools' it is our social responsibility to change and meet the needs of the new work force. Change of attitude toward women and minorities and actions will help maintain our competitive edge as a nation.

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