

FOSTERING THE ENGINEERING EDUCATION OF WOMEN UNDERGRADUATES
PAPER PRESENTATION
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INTRODUCTION

Let me first of all thank the chairperson and member of the international conference of engineering education (ICEE 2007) paper committee, for giving me the opportunity to speak on this subject, which is very close to my heart and of major concern to me. Engineering as a body of knowledge has made tremendous contributions to the development of mankind (man and woman). The word 'Engineer' comes from the Latin word "ingenium" meaning talent, genius, cleverness or native ability on the other hand. Engineering is the professional art of applying science to the optimum conversion of the resources of nature to the uses of mankind. It baffles my imagination each time I go through a curriculum reform and it never allows gender impact not to talk of integrating the curriculum with strategies to establish gender equity. I think they do it that way because they think that improving the quality of engineering education without considering gender will help all engineering graduates. I think it is time something is done about it. Reforms such as establishing relevance of course material are always done from a male perspective and would always have nothing to do with the woman, this is making some young women think that engineering is deadly and as such run from engineering. A lot of women like Lillian Gilberth who is the first woman engineer to be elected into the National Academy of Engineering (NAE) in 1965, Ema Schneider Hoover who invented the first computerized telephone switching system, Randi Altschul who invented the world's first disposable cell phone just to mention a few, have made great marks in engineering and inventions too.

This paper therefore seek to suggests new goals for curriculum reform and the catch them young syndrome. I also challenge most countries especially my country Nigeria to consider the goal of equity, Victor Nwadike an educationist in one of his write ups said that at the dawn of 2002, Nigeria is still not certain where it is headed; her destination in education is still unknown. With her destination still unknown, how does one foster the engineering education of women undergraduates in Nigeria? Adopting equity as a goal means a commitment to end oppression based on gender, and seek justice not only in the classrooms but also across the profession and society. I call for support of gender equality and the catch them young syndrome for full participation of the underrepresented group.

GENDER EQUITY

WHY GENDER EQUITY IN ENGINEERING?

This is the principle and practice of fair allocation of resources, programs and decision-making to both women and men and it includes the redressing of the identified imbalances in the benefits available.

Knowledge as we all know is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing, but knowledge cannot be bestowed fully if the learning environment and conditions are not gender complaint. Common to national reports on engineering education in the 50s, 80s, 90s and even 00s among other things calls for emphasizing communications, social skills and integrating social sciences into the curriculum, incorporating good teaching and appreciation of life-long learning. Gender equity is well suited to those reforms, because of their integrative orientation and their emphases on community and social changes, critical thinking and communication skills.

Gender equity is a central topic of discussion, a shift that may hold the key to attracting more women to engineering. Critical challenges in engineering in this decade, is challenging the developing world, of which Nigeria is one. Engineers will play an important role to this by meeting basic human needs and would require critical training and social analytic skills to navigate important choices around the power of multi national companies, autonomy of local communities and government of Nigeria to use indigenous knowledge in meeting the needs of indigenous people.

Gender Equity will teach women undergraduates to question authorities and challenge oppressive systems in their life's work.

Engineering will change for the better and even for the best, if Gender Equity is put into play as this will prepare effective women engineers who will be critically aware of the system in which they work, as well as the ability and desire to change any system which falls short of standard.

Ethics and Policy

Integrating issues of ethics and policy in engineering education supports the goals of gender equity, women undergraduates must be made to understand what it means to be an engineer, and know the impact their work will have on the society and the world at large. In the second manifestation of the course, the women undergraduates should be assigned ethics problem; this will help this prospective women engineers practice seeing ethical problems from a number of perspectives and talk issues through with their colleagues.

De-centering western civilization in engineering classroom

Using thermodynamics as a case study, an obvious problem in teaching thermodynamics rests in the fact that the traditional body of knowledge is wholly western-centered, with men being the upper class heroes. If we dig a little into the history of science literature, this believes that men are upper class heroes can be altered. Amazingly I discovered from books that women are also investors, discussing thermodynamic application such as the Chinese under floor heating and human and water powered fans, Egyptian oil lamps and double boiler. It was the American Women

who invented power generation and engine process from potatoes boilers and stove improvement, there are so many of this examples which can be found in Science Literatures, these materials should be integrated into the courses as part of reading rather than merely presenting it as an add-on and in most cases not even mentioned.

CATCH THEM YOUNG SYNDROME CLASSROOM DYNAMICS

Studies have shown that there are gender differences in communication style in the classroom, in general, men tend to respond to questions more confidently, aggressively and quickly, regardless of the quality of their response; they tend to speak more freely and spontaneously in the class, formulating their answers as they speak. Women on the other hand, wait longer to respond to a question in class, choosing their words carefully, these makes them feel their impact is not felt in the class and then they decide to quit (drop out). The act of catching them young should be imbibed, so that from pre-schools, primary and secondary schools like in this can be achieved in the following ways.

Encourage class participation

Teachers should allow time wait before choosing someone to answer a question, it might be uncomfortable, but more pupils/students would be confident to participate in questions and answers.

Whom do you call upon?

Teachers should be aware of whom to call upon to answer questions in the class, and how they (teachers) answer asked questions in class especially in a class the men see themselves as lords, but unknowingly, teachers tend to call upon boys in the class to answer asked questions.

Use of language materials

Teachers should Endeavour to praise their female pupils each time they make attempt to answer questions in the class, they should give in their best to learn the names of the pupils in their class choosing pet names for their pupils would go along way to help because they will feel belonged to the class. Teachers should always Endeavour to refer to female scientist as well as male scientist. Teachers should also include in their scheme of work, materials that support women in science, whether journals or magazines or even books on science research that involve women, and this will help make the female students have a greater feeling of connection.

Provision of more female science secondary schools

Government and people should provide more female science schools fully equipped with science laboratories and good science teachers, just like in Brazil there is a football academy which helps in catching future footballers, if the Brazilian Government can go this far because they want to remain unbeatable in football, I mean we can do more to get women to study engineering. The provision of more female science secondary schools would go along way to help in catching future engineers and inventors.

CONCLUSION

Time I know would be the only constraint to implement Gender equity in our institutions of learning, if we must effectively achieve these goals, we must put in all of our time, we need absolute concentration and dedication to be able to effect the changes required in the curriculum. And if we must catch them young we must be patient too. In a nutshell time is all we need to achieve these goals.

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