Nominations are being accepted for

Institute of Industrial Engineers

The Wellington Award

DEADLINE: February 2, 2015

PURPOSE

The purpose of the award is to recognize outstanding long-term contributions and service in the field of Engineering Economy that enhance the visibility of the Engineering Economy community of IIE.

ELEGIBILITY and CRITERIA

The Wellington Award is limited to individuals that have made significant contributions to the field of Engineering Economy. The award is based on the following areas:

Original contributions to the profession
- Publications (articles, books, monographs, etc.)
- Research (theoretical development, methodological innovation, etc.)
- Standardization (notation, methods, formats, etc.)

Recognition of service to the profession
- Leadership in organizations (contribution as officer, editor, program chair, committee chair, etc.)
- Involvement in organization activities (professional organizations, private industry, government, development of new organizations, etc.)
- Contribution to the profession (book reviews, case studies, bibliographies, abstracts, interest tables, calculating devices, etc.)
- Length and quality of service

Application of engineering economy
- Proper application of principles
- Scope and importance of application
- Originality
- Presentation

NOMINATION

Send an electronic letter of nomination (with any supporting information available) to Dr. Lee Blank by email to lelandblank@yahoo.com prior to February 2, 2015. Questions may be directed to the same address.

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[Editor’s Note: Dr. Bafna was awarded the Engineering Economy Division’s inaugural “Best Engineering Economy Teacher Award 2014” in Montreal. There he was also declared a runner-up in the “Innovations in Curriculum Competition.” He participated as a panelist in the roundtable session “Engineering Economy Education in the 21st Century” organized by our Division.]

It’s Time to Change!!!
Kailash M. Bafna, Ph.D., P.E., Professor
Western Michigan University

The Need for Change:

Since the turn of the millennium, the students attending our colleges and universities are very different than those who attended in the 1980’s and 1990’s. Among several changes in characteristics that each new generation of students bring, the biggest change in the millennial generation is that they were born and brought up in the “computer” age. They enjoy spending time on computers, tablets, and smartphones and, in general, are a lot more tech-savvy than their professors and instructors. This millennial generation of students is constantly using some form of technology-based device. In spite of this, in the classroom we still continue to teach Engineering Economics in the same way that it has been taught for decades. Specifically, we still use formulas, interest tables, and calculators for teaching a majority of the course with some assignments using Excel. Even the books in this subject area use formulas and interest tables for solving a majority of the examples included in each chapter with some examples using Excel towards the end of the chapter.

Characteristics of Today’s Students:

Since we are teaching a drastically different group of students in college today, changes need to be made in the way engineering economics is taught. In order to appreciate the ideas proposed later, it would help to summarize some of the unique characteristics of the two generations: Gen Y (aka, millennials) who is currently in college and Gen Z that will start entering college in another three years.

- With all the electronic devices available today coupled with the variety of social media competing for their time, today’s students have developed shorter attention spans. As such, a majority of them cannot keep their focus in the classroom during the traditional hour-long lectures.
- With their involvement in multi-media activities and their ability to do multi-tasking (such as watching programs on TV, playing computer games, browsing the web, and listening to music though iPods, MP3 players and smart phones), the traditional classroom lectures are boring for them.
- With more students in these generations paying their way through college, a large majority of them work part time and hence need greater flexibility in their class scheduling.
- Research has shown that this generation of students prefers activity-based learning and would rather work with their peers in group activities than alone.
- The millennial students do not like extensive readings from text books and consider these as formal and detailed writings. In their quest for knowledge, they find it much faster to get information from the web than read the text books. They are more interested in seeking answers to their questions than expanding their knowledge base through widespread readings.
Proposed Changes which can be implemented:

Now let me propose some ideas for changes that can be implemented in teaching engineering economics to make it better suited for the millennial generation. These are based on changes which I have made during the past 3 ½ years and have received very positive feedback from my students. With over 450 students who have taken my classes during this period, I have found that these changes have resulted in substantially improved class performance.

1. The flipped classroom technique can easily be used for small or larger lecture classes. I have stopped lecturing in the classroom and use this technique for my classes. I have recorded all my lectures on my laptop (this is a very simple process using screen recording software) and these videos are uploaded on the university’s streaming server. Students view them at their convenience following a weekly schedule allowing them greater flexibility in scheduling other activities. If a student does not understand the lecture in the first sitting, he can view it multiple times. Moreover, I have the advantage of not having to lecture on the same topic every semester since I can use the same videos, with changes if necessary.

2. The entire course can be taught using Excel instead of formulas which are used in engineering economics. I have found Excel to be an extremely powerful tool and, with its built-in functions and the Goal-seek feature, it can do almost everything that is taught in this course. Students enjoy using Excel instead of formulas to solve the problems since it is much faster with less chance of errors which arise when one keys in numbers into a calculator. After four years of experimenting with using Excel in a variety of scenarios, I have found the best scenario to include formulas, functions, and Excel when teaching the time value of money chapters. Using formulas helps them understand the concepts of time value of money better. It also prepares them for the FE exam which students take for becoming a registered Professional Engineer. I teach the rest of the course using Excel only. The biggest advantage of using Excel for the entire course is that the students are job ready.

3. In the first part of the course where problems are solved using formulas and factors, my students no longer use interest tables. In fact, I have programmed the formulas in Excel into a table which I call the “Factor Calculator”. When solving problems, the students use this to find the values of the factors. One big drawback of interest tables is the need to do linear interpolation between given values of interest tables and number of periods. This unnecessary (and sometimes tedious) procedure is completely eliminated with the Factor Calculator and the accuracy is much greater.

4. Since the millennials learn better through activity-based learning, if they can obtain the knowledge base at home by viewing lecture videos, in the classroom meetings they can work in groups to apply the material in solving problems.

Conclusion:

I have given some general ideas for changes and, to begin with, one does not have to implement all the changes at one time. Also, the suggestions given above will have to be modified based on individual scenarios such as class size, availability of and limitations on the size of computer classrooms, large lectures with smaller recitation sections, etc. Whatever the individual scenario, the common denominator is that for maximum efficacy, we cannot continue to teach the Millennials without incorporating some amounts of technology in the classroom. The need for technology in education will become even more apparent as Gen Z students start entering college in three years.
[Author’s Note: I will be glad to share my experiences in the changes that I have made in teaching Engineering Economics with anyone who is interested. I can be contacted by email at kailash.bafna@wmich.edu.]