

Not Ivory Tower Industrial Engineering

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ABSTRACT

Why does academics have to be so 'Ivory Tower'? Why can't academics be mundane, ordinary and pedestrian instead of pedantic. This question could be asked of academicians of every discipline, but in case of Industrial Engineering, that is even more relevant. Can the core principle of optimisation inherent in Industrial Engineering be taken down from the pedestal of Ivory Tower and applied to day to day applications and situations.

A cursory and perfunctory search for definition of Academics in dictionaries on Internet will yield following results : Scholastic, Theoretical, Intellectual, Hypothetical, Abstract. Clearly while that definition does mean that Academics is Respectable, there is a certain pejorative and disdainful connotation to that definition.

Academics can be disconnected to the world, even as academics is supposed to be about the world. A very valid case in point being Economics getting involved in intricate statistical formulas and complicated mathematical paradigms, when what Economics misses is obvious lack of toilets and abundance of slums and hunger and malnutrition in obvious overpopulated surroundings.

What is needed is for academics to get less Ivory Tower and more Down to Earth. This paper is focused on making Industrial Engineering more Down to Earth. This does not necessarily mean contempt for Theoretical. But taking the theoretical to the practical. To take an analogy this is where Karl Marx meets Mao Zedong and Friedrich Engels chats with Vladimir Lenin.

A very slangy, colloquial, provocative, smart-alecky, tongue-in-cheek definition of Engineering could be "An Engineer does in one dollar what an Idiot can't do in Ten."

But a more serious and sober definition would be as follows:

Here is definition of Engineering.

Engineering is application of science and mathematical models to the innovation, design, construction and maintenance of structures,

machines, materials, devices, systems, processes and organisations.

And here is definition of Industrial Engineering.

Industrial Engineering is optimisation of complex processes, systems and organisations by developing, improving and implementing systems of people, money, knowledge, information and equipment.

Basically, industrial engineering seems to be some sort of specialisation in engineering with focus on OPTIMISATION.

Now what is OPTIMISATION?

In lay person's term - optimisation means making best or effective use of situation or resource.

Hence it could be argued that Industrial Engineering means making best use of something.

Industrial Engineering is a recognized academic discipline in the same category as Civil Engineering, Mechanical Engineering and Electrical Engineering. Operation Management is specialisation within Business Administration which has hair splitting difference from Industrial Engineering.

However both Industrial Engineering and Operations Management are very scholarly pursuits with theoretical knowledge that has practical application. However such scholarly pursuits can be made to climb down from ivory tower of academic abstraction to mundane down to earth common sense pedestrian application.

Such common sense pedestrian application of Industrial Engineering, which in essence is Optimisation will not have any mathematical formulas or established procedures. It is just the orientation of optimisation of Industrial Engineering in day to day life.

Just consider the fact that in India, newspapers are given back to rag pickers - raddiwala - and these ragpickers sell them to shops who use them to package goods - eggs, bananas, flowers. That is optimisation. Used clothes of not so poor people find way back to market for use of poor people at one tenth the price. That again is Industrial engineering.

Basically what a student learns in industrial engineering are complicated and evolved

methods of optimisation. These are mathematical and statistical improvements on what is essentially optimisation.

However the orientation of optimisation, that industrial engineering contains can be applied to any and every life situation. But that requires academic discipline of industrial engineering to be brought down from the pedestal of ivory tower and applied to every thing, every time, every situation, every where.

Why has nobody thought of this before?

Of course such pedestrian industrial engineering, which is not ivory tower cannot be taught in colleges and institutions and universities. But industrial engineers who have been trained in optimisation could be hired to apply the basic orientation of optimisation, not so much techniques of optimisation to every day situation.

Governments could hire industrial engineers, corporates could hire industrial engineers, education institutions, medical facilities could use industrial engineers, transportation and housing organisations could use industrial engineers.

An academic discipline called 'COMMON SENSE DOWN TO EARTH INDUSTRIAL ENGINEERING' could get evolved and be actually taught in academic programmes leading to degree in Industrial Engineering. Of course such courses will not have much mathematical content, or predetermined procedures. Just the same optimisation orientation that is refined in other industrial engineering courses will be taught in a rather less formalised manner.

Industrial Engineering Degree Programs have subjects like Supply Chain Management, Quality Management, Materials Management, Production Planning, Work Design, Operations Research and so on. Now they can have an additional course called 'Down to Earth Common Sense Industrial Engineering' which is of course a rather polite way of saying 'Not Ivory Tower Industrial Engineering'

There can be thousands of examples of such 'Not Ivory Tower Industrial Engineering'. This paper cannot cover all thousand. But here are 5 such examples.

1. Socialism by Family Planning.

After Population explosion began since 1900, Governments around the world have started implementing Birth control. However Governments have usually dictated that every one have 2 children at most. Hence the fertility rate per woman

has come down from 7 to 9 children per woman to as around 2 per woman. This in itself is good. But an industrial engineering optimal solution will be to plan families according to incomes. Thus the poor would have 1 child, the middle class could have two children, the upper middle class having 3 children, the rich having 4 children, very rich having 5 children. This will reduce inequalities of income, consumption and wealth even as they reduce and restrict population growth.

2. Tax collection Efficiency

Some times taxes are so distributed that it appears that the cost of collection of taxes is far higher than taxes collected. In fact at least in India income tax and goods and services tax can be eliminated for most people and most goods and services without reducing net revenue which can be defined as revenue minus cost of collection of revenue.

3. Renting Housing for Bachelors.

Usually friends share rent on house. This means 2 or 3 friends share a 4 room house. But clearly a 4 room house can be easily shared by up to 10 people. These could be paying guests of original residents. This way rent can be reduced by almost 70% per person without reduction in comforts.

4. Crowded Trains in Mumbai

Trains in Mumbai are so crowded in peak hours that not only is it difficult to enter, but people hang on doors risking their lives. Now there can be many commonsense industrial engineering(optimisation)solution to this problem such as

1. Give incentives to offices to locate on the other side of town.
2. Make tickets at peak hours expensive.
3. Make organisations rotate their week ends - so instead of fixed week ends the week ends are rotated...thus reducing commuters on any day.
4. Cancel all public holidays and allow people to take more casual leave.
5. Encourage Work from Home
6. Encourage Flexi Timings/ Shifts
7. Increase number of bogies in trains
8. Arrange seats so that number of people who can stand increases

5. Online Shopping

There are so many online shopping sites. However each has its own delivery mechanism. This clearly adds to number of people engaged in

delivery and thus increases costs. An industrial engineering solution would be to mandate that all delivery sites use government postal services for delivery. This will reduce delivery costs. Alternatively there can be regional hubs where delivery sites drop their goods and these regional hubs will have their own delivery mechanisms to exact addresses. Or delivery sites can have their pick up points from where customers can pick up their goods.

Actually this sort of 'Not Ivory Tower Industrial Engineering' has as much divergent creative thinking as much as convergent analytical thinking with mathematical tentacles. However the objective of optimisation is inherent in this kind of 'Not Ivory Tower Industrial Engineering'

CONCLUSION

The idea of 'Not Ivory Tower Industrial Engineering, which can be euphemistically described as 'Common Sense Down to Earth Industrial Engineering' will appear to the academic world as rather blasphemous and sacrilegious and heretical if not down right insulting.

But the academic world is meant to train people so that they can function outside the academic world. And if a rather pedestrian orientation rather than a pedantic inclination trains students more completely then what is wrong in stepping out of comfort zone to train students in more practical rather than theoretical industrial engineering while retaining the essence of industrial engineering.

This thought of 'Down to Earth Common Sense Industrial Engineering' is Original, Seminal to the point of being Revolutionary. Hence it is expected that there is very little peer academic work on this preceding this. However this paper could be a start of avalanche of academic work that could create a new subject to be taught within academic programmes leading to degree in industrial engineering.