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**TEACHING ENGINEERING ETHICS IN ASIA FROM WESTERN RE-SOURCES****Dr. N. Krishnamurthy, (Self-employed)**

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# **TEACHING ENGINEERING ETHICS TO ASIAN STUDENTS FROM WESTERN RESOURCES**

## **1. INTRODUCTION**

Professional ethics is very subjective, rooted in culture which is a function of many factors such as country, religion, language, and social status. Thus professionalism and (hence) teaching of professionalism, in Eastern hemisphere differs drastically from that in Western hemisphere. Most publications on engineering professionalism are from the West. Teaching from them tends to direct the students towards Western values, bolstered by case studies mostly from USA, and some from UK and Europe, with a few examples of how some Western industries got mixed up in mismanagement in Asia. Recent editions of popular texts provide a token page or section on Eastern cultures such as the Chinese and religions such as Hinduism or Buddhism.

I taught engineering ethics at two universities in Singapore: Group-A, mostly Singaporean students through the engineering division in a public university; and Group-B, students mostly from other Asian countries, at the Singapore campus of an Australian University, through their philosophy department. The coverage was very similar in both courses. In both, I faced the dilemma of an Asian teaching Asians from Western resources. Having studied under British teachers in junior college in India and having lived and taught in USA, I was quite at home with all the ethics concepts and case studies as well as the idiom of the source materials.

But I felt somewhat uncomfortable basing all arguments on the Western way of life. Without violating the curriculum, I inserted key concepts of Asian ethics into my lectures. With innumerable religions and sects in non-Christian religions, I was content to point out the many similarities in morality-based ethics and in most social and professional situations. But I was careful to avoid dogma and contrasts, particularly of attitudinal differences.

Hereinafter when I refer to individuals with the male pronoun, I will be implying the female counterpart, except when the context is gender specific.

## **2. PROFILE OF THE TWO GROUPS**

Group-A was at the National University of Singapore, ranked by Quacquarelli Symonds (QS) as twelfth in the world and first in Asia<sup>1</sup>. The course was titled 'Engineering Professionalism' and was required of all engineering students, mostly locals with a sprinkling of students from other Asian countries and a rare exchange student or two from the West. Class size was around 700 per semester, split into two batches of about 350. I taught the first overview and ethical theories module for ten semesters in five years, in three two-hour lectures with slides. There were tutorials for batches of about twelve each, a few handled by me and the rest by tutors. The tutorials enabled effort by and assessment of individuals and of small teams three or four strong for a team project with ethical content at the end of the course. I enjoyed the whole experience.

Group-A was culturally homogeneous and fairly cosmopolitan, with predictable engineering background and broad exposure to Western life.

Group-B was at the Singapore campus of an Australian University (AU) ranked by QS fairly high world-wide, the campus being located at a well-known local Academy. The class size varied between 30 and 40, and I handled all the twelve three-hour lectures-cum-tutorials, project guidance, and assessments, once a year for the same five years. Group-B was heterogeneous, parochial and provincial, with widely divergent engineering backgrounds and only superficial familiarity with Western ways, often of the professionally irrelevant kind. While I did enjoy the challenges of teaching the subject to such a group, I discovered that I had to extensively tailor my pedagogical, communication, and assessment methods to this special audience.

Most international students in Singapore Government-approved universities (– equivalent of accredited universities in USA) are among the best from the respective countries. It is very rare for a below-average student to enter – even rarer to survive in – a recognized university purely by paying high fees. It may thus be taken for granted that the student samples in Groups A and B were of quite high caliber, each in its class. Both native and foreign students performed equally well in science- and math-based courses, with international students sometimes better than local students because of greater motivation and financial constraints for off-campus activities.

### **3. ASPECTS OF TEACHING ETHICS TO ASIAN STUDENTS**

#### **3.1. Language Issues**

In most cases of poor performance by international students (Asian or otherwise), the cause could be traced to language issues, particularly in understanding the teacher and the material, and in expressing descriptive passages and abstract concepts in the English language. Singapore having been under British rule until after World War II and continuing to be under the influence of Britain-trained policy makers, its *lingua-franca* is English, more British than American.

In Group-A, by the time the student reached my course (Junior-Senior level), the foreign students had caught up with local idiom (– playfully referred to as 'Singlish') and the presentation skills of their peers sufficiently to hold their own in class and do well in assessments. Language mistakes might be hidden in team assignments; but in individual assessments, I would point out grammatical and syntactical errors, more to educate the student than to decide the grade. If the error was not conceptual, I would ignore it in my grading. In team projects I would be stricter, on the basis that someone in the team should have cleaned up the language. But language was not a problem with this group. Most students had grown with and into the system. They also knew the boundaries within which they could take help in class and outside, and did not mind making mistakes. So they 'let it all hang out', and most of the time it met minimum standards.

In Group-B, strict parity with the syllabus and assessment standards of the parent foreign university had to be maintained, but some modifications became necessary. Fair implementation of quizzes and getting through (or around) certain strict requirements became a formidable challenge to me. Without implying any specific misconduct, I discovered a major difference between the students' verbal expression in class and their written submissions brought from

home, the latter tending to be much more coherent and grammatically correct than the former – obviously their pride would urge them to work harder on the answer from home! I discussed with AU coordinators the need for adjustments to cater to this special group, and most of the time they saw the logic of my proposals and approved them. Thus for instance, I was able to substitute two home essays with one home essay (with 5% fewer marks than proposed) and a second test.

### **3.2. Tutorials and Team Work**

For Group-A, each tutorial batch of about twelve was divided into three or four teams of (preferably) three or (maximum) four students for team projects. Project team formation and functioning was no problem. The whole group was egalitarian: Each batch would have been picked by the computer mainly to avoid scheduling conflicts (with some limited 'bidding' by the students to opt for a certain hour), and hence rarely did soul mates make up a team. Once project teams were formed the members swapped cell phone numbers and made arrangements on when and where to meet to discuss and carry out their projects. Apart from team presentations, tutorials were not group activities, but opportunities for individual response and assessment.

With Group-B, it was a different story. AU laid more emphasis on tutorials than on lectures by two hours to one in each three-hour session. Students were required to form teams of 4 to 6 for projects. During tutorials the same teams were required to discuss and vet one another's mini-reports. The first tutorial experience in this mode convinced me of the futility of this exercise. Students too did not get much out of it and preferred the lecture mode. I got approved a change to two-hour lectures and one-hour tutorials. Even for one-hour tutorials, two problems surfaced.

One: Invariably all students from a particular country, and from the same majority ethnic group would insist on making up a team – I will refer to this as a 'clan'. Trouble arose when more than seven from the same clan wanted to be a team. They would argue with all sorts of reasons for me to let them be a single team. They also resisted the required inclusion of at least one member from another discipline if he was not from their clan. I had to hold firm on both counts.

Two: The tutorial intent of brain-storming just did not work. All the team chatter was in the clan's native tongue (none of which I understood) with a lot of body-language and loud laughter. After a few minutes of apparently serious participation by all the members of a team, the self-appointed 'leader' would harangue the group in a commander-soldiers fashion, while I watched helplessly at what was obviously not the course discussion but a gossiping or joke-sharing event.

Instead, I used the tutorial hour to let the teams discuss their projects as I went round checking on their work, and answering questions on the project or lecture matter individually. While clearing doubts, I would call for the attention of the entire class if the question was of common import. As there was not much room for me to judge individual performances from this group activity, I introduced the American type 'pop-quiz' at the end of each tutorial.

### **3.3. Individual assessment**

For both groups, even in the team projects, marks for 90 % of the maximum were given to all the members of the team, but the other 10% would be allocated to how the individual student

handled his presentation, and responded to questions from me and/or from the audience.

Group-A's individual assessment was a breeze. I would split or expand the common tutorial questions set for the entire class by the lecturer into as many parts as there were students in my batch, and assign two parts to each student. At the next tutorial session I would call upon each student (in random order) to present the answer to one of the two parts assigned as I chose, with the aid of half a page answer projected on the screen (without PowerPoint!) in three to four minutes. Apart from presentation marks, I would give points to the presenter for answering questions from me or the audience. To keep the audience on its toes, I would also set marks for a student I picked from the audience (giving everyone an equal chance) to ask a question or make a comment. It worked smoothly and well, although I had to be quite alert to give equal time and opportunity to all the students, and also be nimble with my fingers on my laptop spreadsheet.

For Group-B, I had to modify the 'pop' part of the pop-quiz as the idea was completely alien to them, by defining what would be covered in the next quiz. I had also to keep it open book so that they would not get uptight worrying about it as a mini-test. They were to bring their own texts and not share them during the quiz. I designed most pop-quiz questions to make the student summarize a passage or draw conclusions from a case study from the text in his own words. So he had to know the stuff well to answer within the short time available.

With ten minutes to go at the end of every tutorial, after the students took their seats facing the front, I would write the question on the board (or project them from a slide) for them to answer and hand over. The answers I received would range from a couple of mis-spelt disconnected words to a few short sentences with some spelling and grammatical errors. I overlooked the language part and sought out the idea behind it to grade the student.

The first quiz was an eye-opener. In such close quarters as a lecture room would allow, everybody could see their neighbors' answers without turning their heads. Predictably there were too many identical answers right down to grammatical mistakes. To discourage such 'accidental' straying of sight and influence on answers, I resorted to the mutually painful practice of setting two questions A and B each time, and handing out blank sheets boldly marked 'A' and 'B' at top right, alternately to seated students, after which they could focus on their own answers in peace.

The first time, there was also an audible buzz as the students started 'thinking aloud' in their native tongues in something like a stage whisper. When I objected to it, a couple of them said with a straight face they had to do it to translate their answers into English inside their heads! I insisted that they give up this habit as it might "*disturb the others who may be focusing on their own versions of the answer*", after which they reluctantly agreed.

Once the students knew I meant business, they fell into line. As I also helped them get where I wanted them to be, everything went smoothly. I got more questions on subject matter and could see a steady improvement in their class attention (rather than 'attendance'), and confidence.

### **3.4. Perceptions on Ethical Issues**

I normally introduce ethical theories in the order (i) Virtue ethics, (ii) Rights ethics, (iii) Duty

ethics ('Deontologism'), and (iv) Utilitarianism ('Teleologism'). Group-A took all this in its stride, just as they would have Newton's Laws. In such a massive class, individual doubts could not be cleared. But tutorial batches would ask me for clarifications on lecture material during tutorials. To give all other students the benefit of my explanations, I opened a Q & A page on my website. This worked so well that other students not in my tutorials (and tutors) would browse and ask additional questions by email, and I would respond to them also through the website.

But Group-B had problems with the content. They understood and appreciated virtue ethics fully, because it was rooted in morality based on religion and traditional social norms. There was near-unanimity on such issues as truthfulness, hard work, kindness, etc. Most of the Judeo-Christian Ten Commandments were reflected almost identically in the Koran, and paralleled Buddha's Eight-Fold path, and teachings of the Hindu Bhagavath Geetha. Even agnostic philosophers Kant, Confucius and Laozi echoed many similar values. As I elaborated on the parallels between main religions to the surprise of many, the group felt good. But when it came to later theories and 'professional ethics', wide differences in perceptions surfaced.

***(a) Duties and Rights:***

Group-A understood and accepted duties and rights as logically sound theories without any emotional impact or controversy. But, to students in Group-B duty was the code by which Asian individuals and families, their community and civic organizations existed. They lived believing that as long as one did his duty to family and society, one would reap all rewards in the after-life as well as in this life. Duties of and towards parents, other elders and children, teachers and students, ruler and the ruled, employer and employee, host and guest, were the all-pervasive principle in their life. In practice, duty was expected to flow mainly from the junior to the senior.

To most Asians, duties were what they owed to God, family and society. Rights were what they happened to be given as reward or allowed to do by others to whom they did their duty. This was in complete contrast to neo-Western thought, insisting that every human had inalienable birth-rights, and duties were a necessary return favor. It was difficult to convince the group that duties and rights were the two sides of the same coin. In fact, the rebound effect of that concept was worrisome: One student asked, "*So I have a right to bring notes into an exam to help me to answer?*" To which I had to explain that one's rights should not be counter to any duty, and that if everybody exercised only their rights without carrying out their duties, chaos would result.

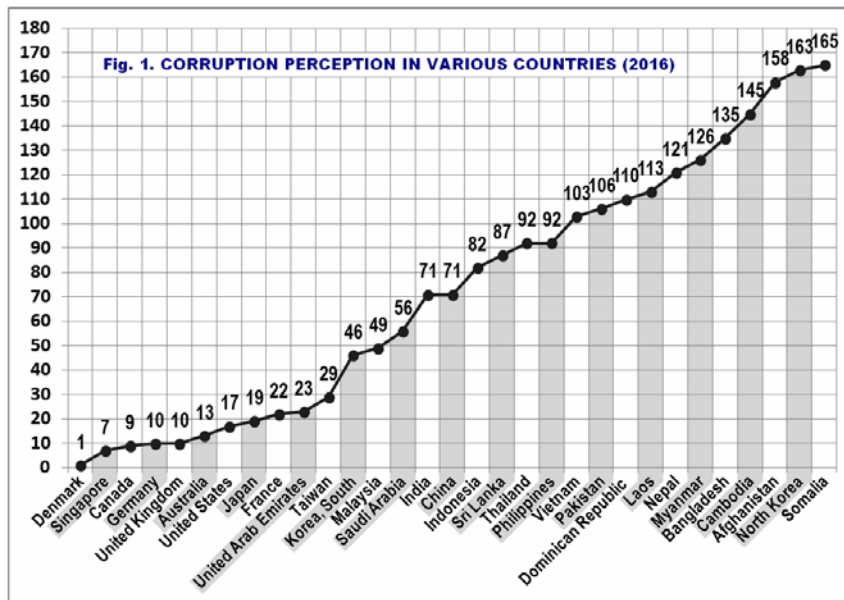
***(b) Corruption:***

Singapore is a young and small island nation with its leaders uncorrupt and citizenry well disciplined. Only a couple of cases of corruption would make media headlines in any year, and would be dealt with so promptly and harshly that others who might have felt tempted to take short cuts would banish the thought. So any discussion of corruption in class was considered at worst irrelevant, and at best a review of 'foreign' chicanery, endured as academic penance!

In Group-A even non-Singapore nationals soon became accustomed to Singapore's high anti-corruption standards. They had no problem following the various Western ethical theories and simply took the case studies as aberrations in foreign lands. Even if a few did not agree with

some decisions, they accepted them as course requirements.

But Group-B accepted certain concepts, and rejected others. For a (relatively) unbiased assessment of corruption, I would show something like Figure 1. The figure, indicating an average ranking from two reliable sources<sup>2,3</sup>, does not cover all the 180 countries involved in the survey ranging from No. 1 (Denmark) to the last (No. 165 being less than 180 because of countries having same rank). It shows 31 nations, some as 'benchmarks' and half a dozen South East Asian countries of my students, with others tacked on to avoid specific identification.



Group-B's first reaction was, "Well, what else can you expect from surveys done by Westerners?" When I showed them the metrics underlying the numbers, students from high corruption-index countries would retort that the measures were all wrong. In their countries, what Westerners considered a bribe was given and taken as 'greasing' the wheels of bureaucratic machinery for a better outcome, much akin to paying  $x$  dollars more to get a seat with extra leg room in a budget airline. In some countries, it appeared that even receipts were given for such pay-offs and could be declared as 'special service charges' for income tax. They did not complain about unfairness of ranking or exhibit any embarrassment, but just ignored the chart.

When later I presented the Agnew corruption case study<sup>4</sup> from the American text book, they raised their eyebrows, and one of the bolder ones asked, "He was charged in court and had to resign for taking just 5% from the contractors?" They held on to their view that in those countries which were tough on corruption, it might be illegal but not unethical.

### (c) Whistle-blowing:

My presentation of Boisjoly's memo<sup>5</sup> on NASA's space shot of Challenger shuttle which blew up when launched over his objection also had a mixed reception. While the few foreign students in Group-A accepted the recent surge of encouragement of whistle-blowing in Singapore and Western nations as a positive move, most Asians in Group-B did not think it was

proper. To them, if you "ate the salt" from your employer, you must serve him loyally and not "bite the hand that fed you". If you could not stand it, you just left and moved on instead of bad-mouthing your employer. After all, Boisjoly had warned them about the dangers of cold-weather launching as part of his duty. He did not have to worry about what his boss did after that!

When I expanded on the theme pointing out the social and human costs of allowing undue exploitation, as well as the many benefits of reporting corporate misdemeanors to higher ups or the media, they insisted that it was for the police to catch them and the courts to punish them, and not for employees to report. They fell in line to get marks, but their hearts were not in it.

***(d) The Golden Rule:***

The 'Golden Rule', which I liked to introduce with the Red Indian version: "*Walk in the moccasins of another for two moons before you judge him*", found an echo in both groups, but with one difference. In Group-A, acceptance was near unanimous. But to many in Group-B, all persons might be (at least theoretically) equal in the eyes of law, but God had created humans with different capabilities and destinies, and each must strive to fulfill the destiny he was born into without coveting the privileges of others above him. It took all my persuasive powers to point out that most of the students were themselves breakaways from the destinies of their parents who were professionally unprepared for modern urban life while they supported their children (the students here) only so the youth could get out of the vicious cycle and advance to competitive careers of global reach. They reluctantly agreed, with reservations.

***(e) Cost-Benefit Ratio:***

Utilitarianism also received mixed reactions. Strong Rule utilitarianism was the norm for both groups A and B. For Group-B, Weak Rule and Act utilitarianism allowed the rich and powerful to get away with violations. But it was the cost-benefit ratio approach to ethics that raised the most hackles. As engineers, students from both groups appreciated the logical need and scientific basis for cost-benefit ratio as a decision-maker for the rightness of an action. But problems arose on which population and what impacts to consider for the costs and benefits.

The Government of Singapore, a small and rich island-nation of about 5 million takes pro-active and patriarchal care of its citizens, protecting them from social and environmental harm by adverse behavior of any enterprise. So much so Singaporeans have not faced the trauma that could be wrought on society and nature by careless and ruthless industries. So students in Group-A did not understand the need to include indirect and even intangible costs and benefits outside the producer-buyer domain, but accepted it as a global theory and dealt with it without emotion.

On the other hand, the attitudes of most non-Singapore Asians of Group-B raised in the pre-WW-II British-Asian model of employer-employee and buyer-seller relationships, had been molded by the profit imperative of private enterprise and the authority wielded by governments. The inclusion of human suffering and environmental damage in estimating costs and benefits sounded unnecessary. If the public wanted the convenience and advantage of a product or service, they must put up with some changes in their environment. Look how convenient plastic bags are! If they are not bio-degradable, and a few fish and cattle die, we cannot help it. Let



'them' find a solution to keep plastics away from other living beings rather than ban plastic.

The classic Ford Pinto case study<sup>6</sup> raised another bone of contention. The conventional analysis still maintained that Ford followed all the then-current norms in estimating human costs. It was only the recent revisionist tendencies and elevated costs of human loss that have forced a review of the net value of innovation and progress, risk-taking and profit making by industry.

How far do we go in becoming inclusive in cost-benefit analysis? Should a cell-phone manufacturer include costs of mercury poisoning from electronic graveyards to Africans in their eco-social cost analysis? Or do they stop at whether and how much radiation from their product affected individual users? What about benefits to users? For instance, how does one calculate the benefits of cell phones: the power of multi-tasking; the joy of immediate connection with your favorite other any time you want; the ability to record various events as and when they happen?

Most of all, how could anybody set any monetary value on a life? I simply told them we were already doing it whether we admitted it or not, with our insurance and compensation levels.

While all this provided a lot of fodder for discussion, it also became another point where the unconvinced were forced to accommodate to an alien concept to get marks, agreeing to disagree, so to speak. It was clear that Asia (– and some nations in the West) would take some more time to connect the dots in regard to universal concerns like global warming and carbon emission.

### **3.5. A Cultural Issue**

I thought I knew all about college youth everywhere in my 59 years of academia in USA, India and Singapore. But I had my own culture shock with Group-B: When I extended my hand to a lady student in traditional Muslim garb to congratulate her on scoring above 90% in my first test, she shrank back and the young man beside her proclaimed, "*She does not want to shake your hand!*" After class, I met the lady student (with the male classmate of course) and politely sought the reason behind her refusal. The young man started explaining, but I requested the lady to say it in her words. She said it was a principle of feminine 'purity' that she followed. I suddenly remembered Michelle Obama's 'Hand-Shake Rows' in Indonesia and Saudi Arabia!<sup>7,8</sup>

Lest we jump to knee-jerk reactions, let me admit to how it was in my own homeland (India) a few decades ago – and still so in some remote villages: Men and women, and different castes not touching each other, women not mixing with others during their periods, and adults not mixing during sacred events and mourning, and so on. Also, in my study of Judaism I had learnt of some orthodox Jewish practices, particularly in Israel; in fact I knew a few families, whose women also practiced certain strict rules of covering their heads, arms and legs and of avoiding unconventional male contact. So this lady student's response did not evoke any feeling of anachronism or discomfort in me. I told her I respected her wishes and decided that I would be more careful in bringing my Indian or Western-learnt ways into a class of Asian students.

## **4. LESSONS LEARNED**

Let me share the lessons I learnt from my ethics teaching experience to two disparate groups:

1. We cannot be too rigid with a mixed group of Asian students, and must assess them for their capabilities and potential rather than strictly on rubrics of Western-defined metrics.
2. We must not misinterpret non-compliance as defiance of authority, but as the students' lack of understanding of why the norms have to be applied in a certain fashion.
3. Any bending of rules may not mean an intention to cheat, but as loyalty to their ethnic or national group, a desire to help the less fortunate (in understanding the course material), and a move to avoid 'loss of face' for a fellow-citizen. Tact and flexibility, plus alternative solutions which do not affect the self-respect of the student are in order.
4. A fair amount of background in Asian religions and cultures, past and present, will be a big plus. The teacher can also learn a lot from such a mixed group identifying with him.
5. Avoid being judgmental about any opinion expressed or any custom followed in class.
6. Ethics text books by Westerners may expand their presentation of Far- and Middle-Eastern ethics, pointing out similarities and differences, not just to cater to the Eastern market, but to broaden the Western approach to professional ethics in a shrinking world.

## 5. CONCLUSION

The students I had were bright, smart, knowledgeable, and mature. Only their communication with others outside their clan and their thinking process were different, conditioned by their culture, which was not necessarily inefficient or inadequate in their native land.

I have wondered how the other lecturers of European stock and training from AU managed the vast cultural divides that confronted teaching of engineering professionalism to Group-B.

My guess is that when taught by a Westerner, most of the Asian students – survivors that they are – will find a way to join the system if they could not beat it, and to meet the norms without offending the guest lecturer, with a clear conscience, and a big smile on their faces!

## 6. REFERENCES

1. Retrieved, 24 Feb. 2017 from: <http://www.nus.edu.sg/global/rankings.html>
2. Retrieved, 25 Feb. 2017 from: <http://www.worldaudit.org/corruption.htm>
3. Retrieved, 25 Feb. 2017 from: [http://www.transparency.org/news/feature/corruption\\_perceptions\\_index\\_2016](http://www.transparency.org/news/feature/corruption_perceptions_index_2016)
4. Franklin, Ben A., "Court Says Agnew Took Bribes; Orders Repayment", *The New York Times*, 28 April 1981.
5. Usher, Shaun (Ed), "The Result would be Catastrophe", *Letters of Note*, 27 Oct. 2009, Retrieved, 27 Feb. 2017 from: <http://www.lettersofnote.com/2009/10/result-would-be-catastrophe.html>
6. \_\_\_\_\_, "Professionalism/The Ford Pinto Gas Tank Controversy", *WikiBooks*, Retrieved, 27 Feb. 2017, [https://en.wikibooks.org/wiki/Professionalism/The\\_Ford\\_Pinto\\_Gas\\_Tank\\_Controversy](https://en.wikibooks.org/wiki/Professionalism/The_Ford_Pinto_Gas_Tank_Controversy)
7. \_\_\_\_\_, "Michelle Obama brushes off Indonesia handshake row", *The Telegraph*, 10 Nov. 2010. Retrieved, 28 Feb. 2017 from: <http://www.telegraph.co.uk/news/worldnews/michelle-obama/8122253/Michelle-Obama-brushes-off-Indonesia-handshake-row.html>
8. Hoye, Mathew, "First lady Michelle Obama shakes hands with Saudi king. So?", *CNN*, 28 Jan. 2015. Retrieved on 28 Feb. 2017 from: <http://edition.cnn.com/2015/01/27/politics/michelle-obama-shakes-hands-saudi-king/>