

The Ability Of Female Lecturers In Teaching Engineering Courses At University Level: A Perception Of Master Students At Tun Hussein Onn University College Of Technology.

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Abstract

The teaching profession is currently said to be dominated by females. It has been said that they are going to dominate this profession because some reasons related to the inside factors and the outside factors. As a women or females, they possess the very basic nurturing and teaching skills called “loving and caring”. This could be one of the inside factors contribute to the domination of female in teaching professions and industries in the future. While man in this advanced technological age tend to be dominated another “world” especially the unwanted world like drug addiction and illegal road races. It is said they were unwilling to “sacrifice” themselves to live in the “feministic” world of education and obviously it come to be one of the outside factors contribute to the domination-to-be by females. This “coffee house” story albeit unaccepted by majority of the mass tend to be accepted as popular reason why a man don’t like to be a teacher or involve in teaching profession. Even though the females come to dominate the teaching professions, there are certain areas in education where males domination still cannot be beaten by females. The area is technical or engineering education. In technical or engineering education, the involvement of female as a teacher or a lecturer is in a small number. However their contribution towards development of technical or engineering education in Malaysia should not be belittle since their role are as important as male counterpart’s role. By this reason, it has been a pleasure to conduct a study regarding the role of female lecturers teaching engineering at university level. This brief study conducted among 50 Master students of Tun Hussein Onn University College of Technology upon their perception on female lecturers teaching engineering at university level. By using the questionnaire set as an instrument, the data collected and analyzed in order to get the findings. The result shows most of the respondents were positively value the efforts and the abilities of female lecturers in teaching engineering courses at university level. Some suggestion were made for improvement as well as for further studies.

Introduction.

For the next decades, educational system in Malaysia will be facing for more challenges especially related to the chain reaction brought up by the globalization. In order to face the impact of globalization and at the same time benefit from the challenges confronted, Malaysian educational system should continue to improve itself to be the world class educational system. This situation has raised high attention from the Ministry of Education when it mentioned clearly by the Minister’s speech,

“A market-sensitive education system is evolving here in Malaysia. Our schools and universities are taking up the challenge of globalisation by changing not only the content of curriculum and programmes but more importantly the delivery systems. IT-enhanced teaching and learning are already making computers in schools, distance learning, video conferencing and internet link commonplace. We have to race ahead to achieve a significant transformation of our educational infrastructure in order to meet the next millennium as a technologically competent and scientifically adept society.” (<http://www.moe.gov.my/frmsis.htm>)

Therefore the changes we are working on whether it's on the content of curriculum and programs or the delivery systems should meet the world class level. Otherwise we will waste our time, resources and expertise. Competition in globalization is not about who win or lose but it's about who will be the super powers or the beggars. By building a world class educational system that is flexible and innovative there's a hope to create here in Malaysia a regional education hub and a centre for educational excellence. As an excellence educational centre our country should be provided with all the facilities needed. The government should give the priorities to the infrastructures building based on latest technological development, staff and teachers training, educational resources, equipment and other important aspects of education.

Educational system in Malaysia should also be able to produce a world class student whose ability to compete in world market is far more better than others from outside the country. Their capacity to perform in multi-dimensional workforce is highly respected by their employers and they can also contribute for the whole development of the nation. The Ministry of Education is fully aware about the situation,

“In the 21st century, the young person entering the workforce will be judged not so much on the knowledge and skills acquired, but on the capacity for lateral thinking, creativity and an integrated approach to learning. The university system is expected to bridge the fundamental shift from an information-based society to a knowledge-based one. Malaysia is therefore putting in place the 'hardware' and 'software' to equip students to take advantage of the opportunities offered by an increasingly interconnected world.” (<http://www.moe.gov.my/frmsis.htm>)

Teaching is the only profession that can facilitate the students to be the world class persons. The word “teaching” referred to the acts of someone who is facilitating a student’s “learning”. In school they were called “teachers”, in practical environment learning they were called “instructors” and they were called “lecturers” at university or college level. Teachers, instructors and lecturers played a vital role in ensuring the successful of instructional processes. Although indirectly stipulated in the National Philosophy of Education, the role of teacher / instructor or a lecturer was long ago accepted as a major part of educational process in Malaysia. Hence the training programs for the teachers /

instructors or lecturers was built upon the great consideration on their contribution.

Women In Engineering and Technical Education

This short paper is trying to outline in a more specific manner about the problem in teaching and learning processes i.e the gender problems in technical education. The problems of gender in teachers training arose vastly due to the rapid changes in education itself. Teaching profession becoming more “*feministic*” through the increasing of female teachers and lecturers. Statistic shows more than 60% of the workforce in education were females and they were dominantly going to outnumbered the male counterpart. The number of female teachers in secondary schools as in January 2001 has exceeded 62.5% compare to male teachers (**1996-2001 Statistic** provided by *Educational Planning and Research Development Unit, Ministry of Education Malaysia*) and they are going to lead the numbers when the new enrolment starting up again.

Engineering education is a part of science and technological education for which the Ministry of Education itself firmly stressed upon its contribution especially in the era of globalization;

“The emphasis is firmly set on Science and Technology to create a wide base of knowledge workers competent and adept to function in an economy that is moving into the new and emerging technology areas; advanced manufacturing, automated manufacturing, electronics, biotechnology and information technology.”
(<http://www.moe.gov.my/global.htm>)

It has been a factual event to see the engineering sectors dominated largely by male engineers. Female were unwelcome albeit their excellence performance in term of knowledge and skills. Traditionally this “*taboo*” was hold long before and accepted by majority of the mass as at least a half-true “*taboo*”. Almost thirty years ago Bardwick (1972) has already mentioned in his book,

“Engineering is viewed as thoroughly masculine field, which parents do not want their daughter to enter, and a field which man engineers resent the presence of women engineers colleague”.

Instruction and learning in engineering is an ongoing process so that an engineer can be trained thoroughly to adapt themselves to the changes. Skillful workers were highly needed in engineering sectors and within that particular skills they can easily access to the instruction, learning and working environment (Wan Norliza, 1982). Teaching engineering is a bit tough compare to other subject especially theory-based subject. Engineering teachers were trained to be more practical-guided teachers and not only theory-guided teachers. When it come to a higher level of instruction especially at university or college level, the task is going to be tougher compare to the lower level. A lecturer needs to go more on his own guided practical session mostly based on his or her research experiences. There will be no more solid-text book to be followed and imitated. It was mostly depended on the ability of the lecturer to make the teaching and

learning session exceeded at its maximum stage. With this challenging part can a female engineering lecturer perform her duties as expected?

Gentleness, sensitive, patient and caring as put by Asma Abdullah (1993) are the main characters of females and it seem like teaching is naturally their profession but considering the field of engineering ones should reconsider their pledge to give fully applause to female. In Asian cultures woman was regarded as a house servant whose services is not welcome rather than look for the kids, cook at the kitchen and treating her husband or her family members. This common view has been kept for many centuries by their tradition (Asma, 1993). There were also loads of negative perceptions on professional females who dare to taking part into the male dominated field. Their character has been seen as nonparallel to the nature of the works in the engineering field. A set of a good attitude such as obedient and sensitive was regarded as weaknesses. There were also inner difficulties facing by most of the professional women taking part in man's world. They seem to be fear to compete with man counterpart and overtime the challenge is taken as a stumbling block stopping them from their journey (Wan Norliza, 1992).

Beside all the constraints happen to hinders the women's mind, they themselves should also be reminded about their own talent. Although the nature of sexuality shows a very distinction different between men and women, the study conducted shows the intellectual ability of women is not so different compare to men. After reviewing the published research on how the sexes differ in intellectual abilities, motivation, self concept, and social behaviour, Maccoby and Jacklin (1974) concluded that there are only four areas in which there is any convincing "real" evidence of differences between males and females that cannot be explained simply by socialization or culture; verbal aptitude, visual-spatial aptitude, mathematical aptitude, and aggression and formally outlined by Slavin (1991),

- i. Females exhibit greater verbal aptitude than males.
- ii. Males apparently exceed females in visual-spatial aptitude.
- iii. Males exceed females in mathematical aptitude.
- iv. Males are more aggressive than females both physically and verbally.

Cross-Cultural data on the Manufacture of Objects and Division of Labor by Sex provided by Mccoby and reprinted by Hoyenga and Hoyenga (1993) showed almost 40 years ago women were already actively involved in man's world including engineering. Study conducted by Viviane (1964) and quoted by Malbin and Youngelson (1972), shows the female who dare to compete with her male counterpart in the man's world will naturally developed their own positive identities and attitudes. Therefore to be actively involved in man's world women should continue to improve their talent, abilities, knowledge and most of all stress on skill-acquired part of the knowledge. Through that way women will not just be accepted in the field of engineering as a lecturer moreover they were also can play a significant role to the future of nation's development.

The Study

This brief study is based upon consideration of a unique roles performed by female lecturers in the field of engineering at university level. It is a survey or descriptive research whereas the data collected is basically a set of opinion and perception of certain selected group. And it also will be invalid to say the findings represented the true nature of the female lecturers whether at the research location or somewhere else. The study conducted at Kolej Universiti Teknologi Tun Hussein Onn, Batu Pahat, Johor and it takes three month to be completed. A group of 50 out 180 Master Students was selected to be the respondents. The instruments developed was a set of questionnaire. Three main part of the question to be answered are;

- i. The perception of the students upon the ability of the female lecturers teaching engineering subjects theoretically.
- ii. The perception of the students upon the ability of the female lecturers teaching engineering subjects practically.
- iii. The perception of the students upon the ability of the female lecturers in conducting measuring and evaluation processes.

Tun Hussein Onn University College of Technology is one of the newest public higher education learning institution. It was currently a fully technical university concentrated on three major parts of technological advances including engineering, technology of engineering and management technology. Due to the rapid growth in physical and academic development, the university has received so many young talented lecturers and among them a number of female lecturers. Although burden with the loads of new assignments and in addition with the lacking of experience they were giving their best in performing their duties. For male lecturers they may be confronted with little problems especially regarding their inexperience in teaching. But the situation will get worst for the female lecturers whose experience is for the less and their abilities to teach compare to male lecturers will also be question as well. Being a new institution mostly will attract a total of goodness but sometimes not to deny the possibilities to face the problems and challenges. This concise study is neither trying to solve the problems nor to offer a gimmicky findings. And of course it is totally not a “court trial” for the female lecturers to degrading or resent their abilities. It is a glimpse for which it can provide a precise related data for the lecturers in order to improve their teaching thoroughly.

The respondents were picked by using selected random sampling. The total number of population are 180 students pursuing their master degree in Technical and Vocational Education. Most of them were former engineering students graduated from UTM or KUiTTHO itself. Their educational background during first degree study gave them some experiential contact with female lecturers for at least once for the whole study years. This assumption were very critical since they were asking to give the information regarding the performance of their female lecturers.

A total of 50 sets of questionnaires were distributed randomly during the end of the class by the researcher who at the same time teaching the class. They

were given 15 minutes to answer the questions and the sheets were picked up as soon as they finish their answer. The data was keyed in to the computer by using Statistical Packages for Social Sciences (SPSS) version 10 and the analysis concentrated on percentage and the mean.

Data Analysis and Findings

The data shown in **Table 1a** to **1d** are the demographic factors of the respondents. **Table 1a** are the gender. 27 out of 50 respondents are male. Total percentage of male respondents is 54% compare to 46% for female respondents. Regarding the races of the respondents, it was recorded 34 (68%) of the respondents were Malays, 12 (24%) were Chinese, 2(4%) were Indian and the rest are other races scored 2(4%) (**Table 1b**). Respondents were also asked to give the details about their past job experience (**Table 1c**). The data recorded more than half (56%) were not having a job experience before pursuing their Master Degree. While in the respondents first degree background the data in **Table 1d** showed they were dispersed in a fair manner whereas the different between three major engineering fields is not too obvious. Although the civil engineering leads in term of quantity but the different is only 1 to 3 respondents compare to mechanical and electrical engineering.

Gender	Total	Percentage
Male	27	54
Female	23	46
Grand Total	50	100

Table 1a : Showed the gender of the respondents.

Races	Total	Percentage
Malay	34	68
Chinese	12	24
Indian	2	4
Others	2	4
Grand Total	50	100

Table 1b: Showed the races represented by the respondents.

Job Experience	Total	Percentage
Having Job Experience	22	44
Without Job Experience	28	56
Grand Total	50	100

Table 1c: Showed the job experience of the respondents.

First Degree Field	Total	Percentage
Civil Engineering	18	36
Mechanical Engineering	15	30
Electrical Engineering	17	34
Grand Total	50	100

Table 1d: Showed the respondent's background of their first degree field.

As it has been put before, the aim of the study is to answer three major questions involving the perception of the respondents upon the ability and the performance of the female engineering lecturer in teaching engineering theories, practical and conducting testing and evaluation process. For the first part the data is shown in **Table 2**. The questions asked were:

1. Female lecturer is having deep understanding about the subject they teach.
2. Female lecturer can always be able to give a clear explanation on particular related topic.
3. Female lecturer can always give a clear example and relates it to the actual events.
4. Female lecturers are good in problem solving related to the topics.
5. Female lecturers are having a broad knowledge in the field they were teaching.
6. Female lecturers always prepare the complete teaching aid equipment in teaching session.

The data provided in Table 2 showed some significant findings. The scales of “strongly agree” and “agree” as well as “strongly not agree” and “not agree” were mixed together to make the analysis become lot more easier. In question number 1, most of the respondents agreed that female lecturers are having deep understanding about the subject they teach and the scores showed 64% of them were in this opinion. Most of the respondents were also agreed female lecturers can always be able to give a clear explanation on particular related subject. This question number 2 represented by 68% of agreement. By referred to the question number 3, there is a mixed opinion about the ability of female lecturers to relate the example given in teaching session with the actual events. The answers given stated most of them were uncertain about the situation. While in the question number 4 which stated “female lecturers are good in problem solving related to the topics they were teaching”, the respondents responded higher in agreement to this statement compare to “not agreed”. The score recorded 52% for agreement and 40% for not agree. For the statement “female lecturers are having a broad knowledge in the field they were teaching” in question number 5, the responds recorded slightly higher in “not agree” compare to “agree”. The meaning of broad knowledge is having ready to give further explanation even at the outside of the field but slightly related to the topic and the whole subject. Lastly the respond upon question number 6 for which the respondents were asked to give the opinion about the preparedness of the female lecturers in their teaching session, the total percentage scores in “agree” is obviously higher than “not agree” whereas total percentage for “agree” recorded 48% compare to 34% for “not agree”.

Question Number	Total (%)	Score in raw data and percentage										Mean
		Strongly Agree		Agree		Uncertain		Not Agree		Strongly Not Agree		
		Total	%	Total	%	Total	%	Total	%	Total	%	
1		13	26	19	38	8	16	6	12	4	8	3.62
	%	64				16		20				
2		15	30	19	38	6	12	6	12	4	8	3.70

	%	68				12		20				
3		6	12	9	18	19	38	10	20	6	12	2.98
	%	30				38		32				
4		11	22	15	30	4	8	12	24	8	16	3.18
	%	52				8		40				
5		7	14	12	24	11	22	16	32	4	8	3.04
	%	38				22		40				
6		9	18	15	30	9	18	9	18	8	16	3.16
	%	48				18		34				
Total Mean											3.28	

Table 2: Mean Scores and percentage of scores for the perception on the ability of female lecturers teaching theories of engineering.

For the second major part of the study is the perception of the respondents upon the ability of female lecturers teaching practical engineering and the data was shown in Table 3. The questions related to the data are:

1. Female lecturers can easily relate the conceptual aspect of the subject to the practical aspect.
2. Female lecturers can easily demonstrate the practical skills thoroughly.
3. Female lecturers have an expertise how to handle the engineering equipment in the laboratories.
4. Female lecturers can easily detect the errors and mistakes of the students during the practical session.
5. Female lecturers can easily describe the implication of the wrong equipment management.
6. Female lecturers can easily adapt to the working environment of engineering skills during practical session.

As was noted in the **Table 3**, the perception of the respondents was scattered around “agree” level to “not agree” level. Although most of the respondents were agreed upon the ability of the female lecturers to making clear the relationship between conceptual aspect of the subjects or topics to the practical aspect, there are a huge numbers were not agreed. This mixed opinion pictured in the total score and percentage of the first question data. Most of the respondents were not agree upon the ability of the female lecturers in demonstrating and conducting practical skills session as was seen in the data of the second question. The same reaction revealed in the sixth question whereas most of the respondents were not agree on the ability of female lecturers to adapt to the working environment of engineering skills during practical session. However the respondents look more positive upon the ability of female lecturers in dealing with engineering equipment especially when most of them agreed on the ability of female lecturers to easily describe the implication of the wrong equipment managing and handling.

Question Number	Total (%)	Score in raw data and percentage										Mean
		Strongly Agree		Agree		Uncertain		Not Agree		Strongly Not Agree		
		Total	%	Total	%	Total	%	Total	%	Total	%	
1		9	18	12	24	10	20	11	22	8	16	3.06
	%	42				20		38				
2		4	8	11	22	13	26	14	28	8	16	2.78
	%	30				26		44				
3		8	16	15	30	8	16	13	26	6	12	3.12
	%	46				16		38				
4		5	10	13	26	17	34	12	24	3	6	3.10
	%	36				34		30				
5		7	14	19	38	4	8	16	32	4	8	3.18
	%	52				8		40				
6		6	12	12	24	12	24	15	30	5	10	2.98
	%	36				24		40				
Total Mean											3.04	

Table 3: Mean Scores and percentage of scores for the perception on the ability of female lecturers teaching engineering practically.

We come to the last part of the study in dealing with the outcome of the data. The last or third part of the study is trying to look at another important area of teaching and learning processes and it is a process of measuring and evaluation. Based on the data presented in Table 4, the ability of female lecturers in conducting measurement and evaluation session is very remarkable. The mean scores perfectly at par or above the “agree” level. The questions asked were;

1. Female lecturers conducting the measurement and evaluation session perfectly as outlined by the department – 72% agreed and the mean score is 3.72.
2. Female lecturers conducting the measurement and evaluation session based on the exact performance of the students – 58% agreed and the mean score is 3.34.
3. Female lecturers conducting the measurement and evaluation session transparently without prejudice and outside influence– 48% agreed and the mean score is 3.36
4. Female lecturers are always continue to give the motivation to the students to improve their grades - 36% agreed and the mean score is 3.14.
5. Female lecturers always manage to complete their marking and make use to the students to refer their marks on time – 82% agreed and the mean score is 3.98.

Question Number	Total (%)	Score in raw data and percentage										Mean
		Strongly Agree		Agree		Uncertain		Not Agree		Strongly Not Agree		
		Total	%	Total	%	Total	%	Total	%	Total	%	
1		12	24	24	48	4	8	8	16	2	4	3.72
	%	72				8		20				
2		8	16	21	42	5	10	12	24	4	8	3.34
	%	58				10		32				
3		9	18	15	30	14	28	9	18	3	6	3.36
	%	48				28		24				
4		6	12	12	24	17	34	13	26	2	4	3.14
	%	36				34		30				
5		15	30	26	52	4	8	3	6	2	4	3.98
	%	82				8		10				
Total Mean											3.51	

Table 4: Mean Scores and percentage of scores for the perception on the ability of female lecturers conducting the measurement and evaluation session.

Conclusion and Further Study

In conclusion, the respondents were positively accepted the ability of female lecturers in teaching engineering courses or subjects. Although there are mixed reactions concerning the ability of female lecturers teaching engineering during practical and skills session the respondents in general were highly accepting the theoretical ability of the lecturer and moreover they were highly recognized the ability of female lecturers in conducting measurement and evaluation session. With these facts we should not resent or intentionally degrading their ability in performing the duties of the “man” as the taboos once said.

There are many aspects intentionally or unintentionally unexplored due to the time constraints and the limited sources. The scope of the study still leaved to be widen since this brief paper covered only in one institution and the area of study tightened by the limited perception of a group of students. The effectiveness of teachers, instructors and lecturers in conducting their teaching session is not properly described by taking one sided opinion. A more scientific approach in dealing with the study should be applied to the wider perspective and include all the related variables. In that order the study will be more guided and the findings will be more valid to describe the actual situation.

Further related study emphasize on the role of female teachers, instructors and lecturers should be conducted in order to give the exact figures and facts about the undivided important of the females roles in education. Females workforce were not a sub-materials to be installed to a set of completed building as an accessories. They were really a part of main construction building and without them the building is a half-constructed complete.

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