



## **Islamisation of Engineering Education in International Islamic University Malaysia (IIUM): Problems and Prospect**

Zuraida Ahmad\*, Ahmad Faris Ismail, Amir Akramin Shafie,  
Sany Izan Ihsan, Zahurin Halim and Souad A.M.Albat'hi,  
Kulliyyah of Engineering,  
International Islamic University Malaysia, Malaysia

### **Abstract**

The surge for infusing of Islamic knowledge and values into engineering education emerge having realized the gross inadequacies of the western/secular engineering education, which aimed only at outward development of individuals. The intention of integrating the Islamic values is to develop a balanced student personality, pleasing to God and to fellow humans, who promote and encourage ma'ruf (good) and fight munkar (evil). This paper is an attempt to examine the existing engineering education system in Kulliyyah of engineering, IIUM. It examines two fields, which are germane to the whole discussions on the subject matter. The two concepts are the existing engineering education and the Islamic knowledge that is and will be integrated in the engineering curriculum. The authors are also proposing frameworks for the Islamisation of engineering programme, highlighting some obstacles in the proposed frameworks as well as likely trying to encounter and suggest solutions for its success.

**Keywords:** engineering education, Islamisation, education systems, frameworks

### **Abstrak**

Timbulnya usaha menyemai ilmu dan nilai Islam dalam kursus kejuruteraan kerana menyedari kekurangan yang ada pada pengajian kejuruteraan dalam sistem sekular Barat yang hanya menumpukan pada perkembangan lahiriah individu. Tujuan penyemaian nilai Islam ini adalah untuk membentuk personaliti pelajar yang seimbang, hubungan mereka dengan Tuhan dan manusia lain, selain mendukung ma'ruf dan melawan mungkar. Kertas ini bertujuan menyemak-teliti sistem pengajian kejuruteraan yang diajar di Kulliyyah Kejuruteraan, UIAM, dimana dua pembelajaran bidang utama akan diteliti iaitu pengajian kejuruteraan sedia ada dan pengajian kejuruteraan yang disemaikan dengan pengetahuan dan nilai-nilai Islam. Pengarang juga mencadangkan beberapa kerangka kerja untuk islamisasi program kejuruteraan ini, menggariskan kekangan yang wujud atau bakal dihadapi dan seterusnya menyarankan beberapa penyelesaian untuk usaha ini.

**Kata kunci:** pengajian kejuruteraan, pengislaman, sistem pendidikan, kerangka kerja

### **Introduction**

Insufficiencies in engineering education have been exhaustively enumerated in recent years. Engineering faculties heads and professors have been told by the numerous panels as Engineering Accreditation Councils (EAC) that the programmes

must strengthen their coverage of fundamentals, more about 'real world' engineering design and operations, including quality management, more material in frontier areas of engineering, offer more and better instruction in both oral and written communication skills and teamwork skills, provide training in critical and creative thinking skills and problem solving methods; produce graduates who are conversant with engineering ethics and the connection between technology and society; and reduce the number of hours in the engineering curriculum so that it will not burdening student and

*\*Corresponding author: Zuraida Ahmad  
Kulliyyah of Engineering,  
International Islamic University Malaysia (IIUM)  
50728 Kuala Lumpur, Malaysia.  
E-mail: [zuraidaa@iium.edu.my](mailto:zuraidaa@iium.edu.my)*

average student can complete it within four years (EAC manual 2003 and 2007).

At the same time, engineering curriculum reform has received serious attention from industry, government and academic groups as the need for change in engineering education has become well organised problem (Richard et al 2000 and Reagan2005). The existing curriculum is seem to be very unbalanced and there are need for the Islamisation of engineering education and it has long been discussed, yet not implemented. The Islamisation of knowledge in general, has been going on since the birth of Islam. As an issue it is undoubtedly the most promising intellectual agenda of Islamic resurgence and one of the most controversial issues that has captured the imagination and elicited strong reaction from Muslim intellectuals and activists across the globe. Since the second half of the 1970s it has taken more of a central position in the hearts and minds of the concerned Muslim educators and educationalists (Al-Faruqi 1982 and Kasule 2003).

Islamisation of knowledge has become a very popular term and has taken on an identity of its own such that sometimes the semantics are debated without dealing with the underlying concepts. Islamised knowledge is not implied that there is knowledge that is not Islamic. All true knowledge whatever its kind and source is Islamic. Islamic knowledge has no time or space constraints because Islam is universal, being suitable for every place and time. Islamised knowledge should be for the benefit of all humanity and should not be seen as applicable to or monopolised by Muslims (Kasule 2003). Therefore, the process of Islamisation does not call for re-invention of the wheel of knowledge but calls for enrichment of knowledge with an Islamic perspective through reform, correction, and/or re-orientation (Kasule 2005).

The objective of this paper is to discuss on the merits and demerits of the engineering education system in Kulliyah of Engineering, IIUM in correlation with Islamic education. Three frameworks are also proposed in the effort to integrate the Islamic education with the engineering education for producing future balanced IIUM engineers' graduate.

### **Brief History of Engineering Programmes In Iium**

The Kulliyah of Engineering, IIUM which was established in 1994 is having five departments with eight engineering programmes. With the vision to be "world class centre of engineering education and research with values and ethics" the mission of the

Kulliyah of Engineering is to provide quality engineering education, with sufficient scope to include fundamental and specialized knowledge and practice in engineering. To cope with the strict demands of the national and global job market, efforts are directed towards equipping the students with more than just the scientific background. This is fulfilled through enhancing the graduates' soft skills through courses such as occupational English language, management sciences and credited co-curricular activities, as well as a variety of seminars on presentation skills, internet usage, and literature survey.

In an effort to cope with recent trends in engineering education and to enhance the internationalization of the graduates, the Kulliyah has undertaken major steps towards Outcome Based Education (OBE) in accordance with the Washington Accord. OBE is now applied for all Kulliyah's programmes as well as at the course levels. Thus, the educational process is planned towards achieving the targeted graduates' qualities.

### **Current Academic System of Engineering Programmes**

IIUM Engineering curriculum is a 4-years degree programme, which adopted a total credit hour system for a minimum of 142 previously and 138 currently and must be fulfilled prior to receiving the Bachelor of Engineering Degree. The course structure can be categorized as follows:

#### *University Required Courses*

For the University required courses, students have to complete 12 credit hours of university general studies courses (UNGS), 7 credit hours of language studies and 3 credit hours of co-curriculum activities.

#### *Kulliyah Required Courses*

As for the Kulliyah required courses, this comprises of mathematics subjects offered by Department of Science in Engineering and management courses offered by Kulliyah of Economics and Management Sciences.

#### *Core and Elective Courses*

In each specialized degree, students are required to choose at least 9 credit hours of elective courses.

All undergraduate students of Kulliyah of Engineering must undergo an industrial training in a relevant industry/company during the short semester before they embark into the final year of studies. Another feature of IIUM engineering curriculum is that first year courses are common to all students. They will take the specialized programme of study during their second year.

### Inadequacy of Islamisation Implementation in the Current Academic System Of Engineering Programmes

Even though the Kulliyah's claims that the engineering programmes offer an integrated and comprehensive education that transcends the boundaries of various disciplines which is consistent with the Islamic concept of *Tawhid*, the implementation of the system is observed not glowing. The original objective to produce graduates being professionally qualified, competent, as well as having spiritual, intellectual, moral and ethical characteristics towards the development of an integral and harmonious relationship with Allah (the creator), fellow human beings and with the natural environment, is still not fully realized. This shows the inadequacies of the existing curriculum or way of conducting the curriculum in Islamisation of engineering education.

Even though, the Islamic subjects is already in the student's study plan under the university required subject as The Islamic World View (UNGS 2030), Islamic, Knowledge and Civilisation (UNGS 2040), Ethics and Fiqh for Everyday Life (UNGS 2050) as well as a bit in Engineering Professional Ethics, Safety and Environment (GEN 4000) previously known as Engineering Professional Ethics; is seem like not enough to produce a balance students. In the opinion of the authors it possibly due to:

1. The crisis of duality or dichotomy manifesting as teaching of Islamic sciences separate from engineering disciplines with different educators from different kulliyah and different background. The traditional Islamic curriculum was kept unchanged and in reality not responding to the moderns need and on the other hand the secular engineering curriculum adopted from Western, influences students mind in the direction of de-Islamisation.
2. The Islamic education/subjects/courses as mentioned above that compulsory to be taken as university required subjects which were taught to our student is superficial, because it is taught of what is Islam all about and little focus was given on how to become a good Muslim.
3. The educators in engineering discipline in most of the cases were trained in the secular manner and they have the tendency to adopt the pedagogy of teaching the students with Western ways and fulfilling them with the Western aims.
4. IIUM in general and Kulliyah of engineering specifically for the time being, is lacking in an educational outlook, module if not text book that integrated both engineering discipline and the Islamic education as well as other teaching materials at all levels of studies. The students were having difficulties to make references which de-motivated them from searching for the facts.
5. No doubt that there were educators who had the intention to Islamize the courses however, inappropriate approaches have cropped up and these have given the whole process not efficient. The following approaches have been used and have not succeeded because they did not address the core issues of the paradigms and methodology of the disciplines: (a) 'Insertion' of Qur'anic verses and hadiths in an otherwise European piece of writing. (b) Searching for scientific facts in the Qur'an. (c) Searching for Qur'anic proof of scientific facts. (d) Searching for Qur'anic scientific miracles. (e) Searching for parallels between Islamic and Western concepts. (f) Using Islamic in place of Western terminologies. (g) Adding supplementary ideas to the Western knowledge (Ishaq, F. 1989).

In addition, Halaqah (CCHB/CCHS 1011/1012), and other co-curriculum courses such as Fardhu Ain (CCFB/CCFS 1041), Tahfiz Class (CCTH 1021/ CCTH 1022/ CCTH 2021/ CCTH 2022) and Mosque Management Skill (CCMB/CCMS 3281-3282) are also being offered to the student and can be selected as part of their study plan, however, due to the teaching methodology which is emphasis on the exam had detoured the students intention (*niat*) from obtaining *ilm*' and becoming good muslim engineer (*mutaqqin*) to just seeking for good grade. This fact is already highlighted by the representative from Student Representative Council (SRC) in 1/2011 Student Annual General Meeting (SAGM).

If the present state of affairs continues there is a danger of IIUM graduates lost their identities and not being united and creative as Islamic Ummah. The islamisation of engineering education is needed due to the following reason:

1. The need to preserve the Islamic identity from disintegration.
2. Education is the process by which a nation builds the personalities of its youngsters and future generations.

3. Presents Westernise generations are sterile and non-creative, in the field of Western civilisations, because they neither been educated as westerners nor as devout Muslim. As matter of fact, to be creative and productive, and individual should be educated in the context of his culture and along the lines of his value system (Kasule, 2007).

Therefore, to create creativity among the next generation Muslim engineers in IIUM and contribute towards Islamisation of the life of other Muslim Ummah and the world's civilisation, IIUM has to strategise in implementing Islamic system of education.

### **The Elements Needed In Islamisation of Engineering Programmes**

In order to execute the concept of Islamisation of Engineering programme, there are a few elements that are needed to be taken into account objectively (Sharif, K.F, 2007 and Talbani, A. 1996)

1. Emphasis on two major sources of Islamic education, namely the Quran and the Sunnah, as source of authentic revealed educational knowledge, outlining the general guidelines of the educational process in its serene Islamic context.
2. Constructing and studying the Islamic Engineering education models and evaluating those (Cycles of education, curriculum, guidances, educational administration etc.)
3. Preparing textbook and educational materials and media from Islamic point of view at all levels.
4. Training of the needed personnel to fulfil any feature of part of the programme in an Islamic manner.

### **Suggested Approaches to Islamisation of Engineering Education In IIUM**

The inadequacies of the current engineering system are extensively discussed in the previous sub-topic. The duality system coupled with the inadequacy of Islamic teaching materials as well as untrained educators in both filed; Islamic education and engineering field led the Islamisation process not efficient. The authors have congregated some ideas or strategies in islamisation of engineering education models.

### **Islamic education as the foundation for student in lower level of study.**

IIUM is receiving applications from the students to study in engineering programmes from more than 110 countries. They come with different background and culture as well as different basic understanding of Islam. The authors are thinking that there is a need to strengthen their Islamic knowledge at early state of their study through: (a) Grounding in Islamic sciences: basics of *usul al fiqh*, *ulum al Qur'an* and *ulum al hadith*, (b) reading Qur'an and *sunnat* with understanding of the changing time-space dimensions while at the same time knowing limitations of literal reading and interpretations, (c) clarification of basic epistemological issues and relations: *wahy* and *aql*, *ghaib* and *shahada*, *'ilm* and *iman*, (d) Islamic critique of basic paradigms of engineering disciplines.

In order to develop good Islamic foundation/grounding, KOE is proposed to set the Islamisation of Engineering education to 4 main objectives: (a) introduction of Islamic paradigms and concepts in general as they relate to science and engineering (b) strengthening faith, *iman*, through study of Allah's sign in the (advancement of) science and technology (c) appreciating and understanding the juridical, *fiqh*, aspects in creating/innovating/developing a new products (d) Professional etiquette of an engineer; *adab al-muhandis*, from the Islamic perspective.

All the subject related to objectives above is proposed to be taught to the student during their matriculation (center for foundation studies) and some will be continued in the first semester and second semester of their engineering course. Other engineering subjects are proposed to be taught as what currently being practiced after the Islamic knowledge is already concreted to the students.

### **Justification for this proposed approach**

1. Smaller the gap of the difference in Islamic background of the student which ease the teaching and learning of Islamic Knowledge afterwards
2. Good Islamic foundation during the early stage of the students education is needed as this might give overview on the task and responsibilities of a Muslim engineer,

### **Limitations**

1. New set of engineering curriculum need to be established/developed
2. Approval from MQA and EAC are needed.

### **Integration of Islamic values and education in each of the subject teach to the student. (Engineering courses imbued with Islamic values and knowledge)**

In this propose model, the existing engineering curriculum is enriched with Islamic perspective (by accurately reflects the contribution of Islam and Muslims scholars to civilization) and unified with sacred aspect. The course/subject taught must be re-structured, it is not just on what being taught but also how is, it being taught. In this model, the educators must be able to triumph over both in engineering course as well as in the Islamic knowledge.

In this model, the effective Islamic teaching and learning must be meaningful to the students. Students should feel that the contents of the curriculum are worth learning, because if it is meaningful and relevance, students are intrinsically motivated to learn. Students should be led to discover the large connections between the knowledge and skills they are learning, rather than memorising of the facts or information. As Muslim, our students must/should be trained to always keep their eye on the whole picture, or macro-view, whenever studying. This is in part is the meaning of *Tawhid*.

### **Justification for this proposed approach**

1. This model of engineering education emphasized that Islam is a comprehensive religion and its teachings are relevant to every aspect of life and every subject of the curriculum.
2. Infusion of Islamic knowledge into engineering education through this model, will ensure the continuous reminder to the students on the task and responsibilities that they are carrying,
3. The students might be able to correlate the Islamic knowledge with science and technology and thereby divulge the greatness of Allah SWT

### **Limitations**

1. Well trained Murrabies from engineering background to teach Islamic knowledge are essential to ensure that the Islamic education is well infused into the engineering education and it is not just the insertion of Al-quran and hadith.
2. The assessment methods need to be strategized as it is not easy to asses either the students are already internalized the Islamic education that had been taught.

### **“Pondok” style of teaching and learning of engineering education**

The old *Pondok* education system instills the Islamic spirit and inner strength into the heart of each student to form a true and ideal believer. It is an Islamic scholarship tradition system where students are guided by teachers, who serve tirelessly working for the sake of Allah. Their role is vital for the preservation of knowledge, religious practices and the formation of future lines of teachers, in order to diminish social problems and ignorance in the society.

The education system offers vast variety of disciplines in Islamic knowledge. The teaching materials used are traditional textbooks within the confine of the *Syafie Mazhab* (an established school of Jurisprudence) and other *mazhabs* which hold up to the tradition of the *ahli sunnah wal jamaah*.

*Pondok* obliges its students to obey its set rules and practices in order to achieve the aspiration to be a person with a dignity in appearances, conversations, conducts and subsequently the obedience level with Almighty God, to be a true and ideal believer.

The lessons methods are divided into two:

1. *Umumi* (Public) lessons; students are given freedom to choose subjects they want to learn and,
2. *Nizomi* (Systemized) lessons; students are divided into classes according to their abilities

Prof. Dato' Abang Abdullah Ali in his integrity lecture on 18<sup>th</sup> August 2011, in IIUM, has suggested to develop *Pondok* model for engineering education whereby, the students will be taught engineering education and Islamic education at the same time. In the authors opinion, in-order to realise his statement/wish, some adjustment on *Pondok* system has to be made inorder to integrate it with engineering subjects. The changes include:

1. Renewal of educational materials and content of *Pondok's* syllabus by including engineering subjects
2. Renewal of *Pondok* education system and methodology
3. A change in function, whereby the function of religious education will also includes skills and science as well as technology as in engineering.

It is hoped that with this model, the graduates are becoming Muslim scholars as well as graduates that able to face current technology challenge. This *Pondok* style of education must be able to endure,

capable of facing challenges and changes in outside world in line with current times.

#### Justification for this proposed approach

1. Students would be versatile in both Islamic and engineering education
2. The balance of action and behavior in the conduct of devotion to Allah, interact with fellow human beings, and treat the universe / the environment with the advancement of technology.
3. Increased students' understanding and application of Islamic values that come from sources of pure Islamic teachings.

#### Limitations

1. This system needs experts in both Islamic knowledge and engineering who can work together and understand each other.
2. Proper system need to designed and support from the government is really needed so that it is not misunderstood by them

#### Islamisation Implementation In Engineering Education: The Way Forward

The thorough studies on the above-mentioned proposed models need to be executed to see their effectiveness. All the three (3) proposed models involved three (3) main domains namely, (1) students, (2) lecturers/*murrabies* as well as (3) curriculum. The 3 domains are interrelated and must be carefully deliberated to ensure the realization of the islamisation process. Students with enthusiasm in Islamic education as well as the engineering education must be given priority to be chosen as IIUM students; the lecturers/*murrabies* should be retrained to master both Islamic knowledge and engineering and the government, the accreditation agency including the stakeholders must give full support in the new curriculum development which comprises both disciplines.

#### Conclusion

The three models proposed and discussed above, aim to prepare the future engineer for the heavy trust, the *amanat* and being professionally competent as well as highly motivated. He must have personal, professional, intellectual, and spiritual development programs. He must know the proper etiquette of dealing with clients/customers and colleagues. He also must know and avoid professional malpractice. He needs to be equipped with leadership and managerial skills to be able to function properly as a head of an engineering/research team. The future engineer is also hope will

have balance personality, good in engineering field as well as having strong Islamic foundation.

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