EMI FOR ENGINEERING EDUCATION IN ARAB WORLD AND TWENTY FIRST CENTURY CHALLENGES

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Abstract: Developments in engineering, as well as modern technologies are considered the most important requirements for the Twenty First century in the globalised world. Recent research has shown that there is a significant knowledge gap in the required level of international communication for engineering graduates in the Arab world. This is because the medium of study there is primarily Arabic. To overcome this problem, it has become an urgent necessity to implement English as a medium of study.

This paper presents an investigation, which was carried out from the available literature to find possible ways of implementing English Medium Instruction (EMI) in engineering education. This paper also focuses on some non-English speaking countries outside the Arab world, such as the Netherlands, Korea and Indonesia, which have already implemented EMI in engineering education. This study focuses on the problems faced by these non native-English speaking and non-Arabic countries and explores the possibilities of putting into practice the solutions suggested. The paper concludes that in order to improve the engineering education system in Arab countries, it is necessary to implement EMI. Pursuing the internationalisation of the system will achieve a world standard level, not only in engineering, but also in communication skills, for engineering graduates.

Keywords: EMI, engineering education, globalisation, Arab world, bilingual education.

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1. INTRODUCTION

The Arab World refers to the countries where Arabic is the official and first language. Geographically, it stretches from the Arabian Sea in the east to the Atlantic Ocean in the west, and from the Mediterranean Sea in the north to the Horn of Africa and the Indian Ocean in the southeast. The total land area is 11,188,892 square kilometres. The Arab world consists of 22 countries and territories with a combined population of 335 million people straddling North Africa and Western Asia, Al- Alkım (2008).

The 21st Century has introduced many challenges in engineering education. Information technologies hold out the promise of new scientific discoveries, higher standards in communication and increased production, leading to a higher quality of life. The most important challenges to engineering education in the Arab world are the levels of access to information and the quality of education. Problems are currently found in curricula and teaching methods. Lack

of access to computers, the internet, and electronic equipment, as well as teaching staff shortages, are the main problems. (UNESCO 2003).

Globalisation has made English the common medium of communication in most countries. According to Jones and Oberst (2007), restructuring and reformation is consistently required throughout the world. Higher education helps to prepare the professionals who will be responsible for handling markets and industries Jones and Oberst (2007). Thus, at this level, innovative technologies are needed to meet the requirements of globalisation. The Arab world has tried its best to promote engineering studies. They also tried to develop engineering programs that can be favourable for women, Jones and Oberst (2007).

1.1 Globalisation in Higher Education and Engineering Education

Globalisation, in the context of education, can be defined as the integration of information, ideas and knowledge. The term 'Globalisation' was primarily associated with economics. However, its usage is now common in the field of education, De Wit (2002). Globalisation brings the cultures of different countries together. When it comes to education, the effect of globalisation can be felt in terms of languages and technology; it is currently considered that globalisation has made English the common medium of communication in most countries, De Wit (2002). According to Zughoul (2003) the English language has become entrenched in the Arab world, especially after the Second Gulf War 2003.

New technologies are encouraging mergers at a global level. Industries and businesses are becoming international. Engineering problems of the next generation will deal with global issues, and solving complicated tasks. Future engineers must have the ability to combine their knowledge and make connections across different areas and disciplines. In order to become an integral division of the global environment, the educational institutes must modify academic programs, and consider their relevance to the requirements of the knowledge based society. Educators recommend applying the integrated approach for academic programs as common policy for studies, Stukalina (2007). According to Bey et al. (2008) the effects of globalisation can be observed in industry and trade. More technical expertise is needed join the globalised industry, in which the integrated technology exists. For this reason it is required that the educational system of engineering should be improved and developed. Students of engineering now face new responsibilities, duties and skills, and the ability to demonstrate competency are a pre-requisite for future employment. The engineers of the next generation need to be able meet the requirements that have been set by globalisation. Therefore, it would not be wrong to say that globalisation has totally changed the vision of engineering studies, Bey et al. (2008). Globalisation has also provided infrastructures to abate the solving of the complexities and uncertainties regarding any issue. It is of the utmost priority, therefore, that present teaching methods, which are based on outdated, rigorous approaches, be transformed and improved on. In order to produce a more creative, flexible dynamic that is both reflective and matched to current global needs, Zahlan (2007).

1.2 Bilingualism and Education

Bilingualism can be termed as having knowledge of two different languages. It does not mean that the person should be flawless in a given language; the point is to have reasonable knowledge of a language other than the mother tongue, Rasul (2006). When it comes to education,

bilingualism is becoming required because of the competitive world today. It is the world of globalisation and it is necessary to meet the standards of today's industry and market. English has become the language that needs to be adopted by every country for international usage, Zughoul (2003). English Medium Instruction (EMI) means to mix the instruction of subject contents with foreign language teaching as well as learning instead of the first language, a foreign language is used as a vehicle for communication in different subjects, Vinke, Snippe and Jochems (1998). Implementing EMI will mean that the medium of instruction will be English, so that students can be taught according to international standards. EMI is especially necessary at the level of higher education because at this stage the students are on the next step to becoming professionals, needing practical skills for the real world. To implement bilingualism effectively, it will be required that courses be arranged in order to provide the students as well as the instructors with the proper knowledge of the language, Jusuf (2001). Many countries have implemented the EMI system, Schützenhöfer and Mathelitsch (2001). This change has resulted in growth and development in those countries. Therefore, having English as the medium of instruction should be promoted, as the returns of doing so are beneficial, Rasul (2006).

English Medium Instruction (EMI) for non-English is known as a bilingual teaching method. It is a recent emergence and is being implemented widely, Jusuf (2001). The main purpose of introducing this method of teaching is to provide the students with a mixture of language learning and other content area subjects. This with such certainty a good approach to making students learns another language, Jusuf (2001). A foreign language is required in order to improve levels of communication. According to Schützenhöfer and Mathelitsch (2001), the Austrian Ministry of Education supported and promoted this concept of implementing EMI. They concluded that there was a huge need to have foreign language learning in schools and other educational institutes. For this purpose English was chosen. It can be seen that Arab countries are now very much concerned with the developments of communication by using a foreign language. Using a foreign language is an efficient way of improving relations between different states. EMI has encouraged international co-operation and interaction in various education fields, Crystal (2003).

EMI is also helping to influence cultural awareness and learning abilities, Jia-Huey (2007). When first implementing this method, there are some issues that have to be addressed. First of all, it is necessary to develop an interest amongst students to learn a new language. Teachers should also give time to improve student's language learning skills. It is also necessary that efficiently trained staff be appointed. Obviously, students who are not very proficient in English will be unable to read books, journals and newspapers, therefore for those students it is necessary that appropriate methodology be developed, Schützenhöfer and Mathelitsch (2001).

2. QUALITY OF ENGINEERING EDUCATION IN THE ARAB WORLD

Arab countries initially found it is a great challenge to adapt to the global standard level of quality in the field of engineering, Shaw (2003). They tried to develop engineering programs that would be favourable for all, as they wanted more people to take part. Initial results were positive after the implementation of education programs that were aimed at improving the level of engineering studies. Some Arab countries are now able to produce skilled engineers in all areas. Such changes are important not only in the educational sphere; they reflect a desire on the part of

those Arab countries to educate their people to move in the political, social and economical environment, Jones and Oberst (2007). The education of the next generation is very important for any country. Arabic countries have developed very rapidly, so the future of these countries totally depends on the education of its young people.

A report issued by the World Bank (2006) shows that majority of Arab countries, who benefited from oil and other natural resources over the past fifty years, primarily utilised foreign labour in the exploitation of such industries. Immigrant workers, especially in the engineering fields, were hired in large numbers to develop these industries, and the majority of specialists within these fields were non nationals. A study by Al-Jarf (2004) and other studies on teaching medical, science and engineering education in Arabic medium of instruction, including Muhaidib (1998) cited in, Al-Jarf (2004), showed that there was a negative effects on engineering graduates, this is because lack of translations to Arabic language, lack of scientific and engineering research in Arabic and that the industrial market preferably who knows English.

Arab countries need to develop a robust engineering curriculum. Most now are trying to overcome this issue by introducing courses that can enhance English proficiency abilities of students as well as instructors, Zughoul (2003). Arab governments are attempting to enhance education systems by looking at ways of meeting global challenges. Governments are concentrating on higher level education, with particular emphasis on the engineering sector and have reformed the systems so that can meet international requirements. Most of Arab higher institutes are concentrating on the implementation of EMI in educational system so that the graduates of engineering will be able to meet the challenges that are faced by engineers, Al-Jarf (2004). It can be observed in most Arab countries that foreign companies hold a large stake in their respective economies, whilst their own people only make investments. Restructuring is needed in the educational system of the engineering institutes in order to make positions in engineering and other higher education more accessible, available, and widespread. (National report presented to UNESCO 2008).

3. COUNTRIES IMPLEMENTING EMI IN HIGHER EDUCATION SYSTEMS

Implementing EMI is the current trend that is being followed widely. This section discusses some of the countries that have adapted EMI in their educational systems:

3.1 Asia

EMI has been in use in Indonesian higher education for some time, and many universities have developed international programs using EMI. Their goal is to be bilingual; English was being used as the second medium of instruction in its classes by the academic year 2004/2005, Jusuf (2001). There are four factors supporting the possible implementation of EMI at Indonesian universities. These are as follows:

1) Bilingualism aids communicative and societal advantages. 2) English plays an important role in helping motivate students and teachers in learning the language. 3) EMI would help students as well the teachers in exploring English and having more chances to learn it well. 4) Literacy

skills and strategies learned in the native language, Indonesian, is transferred to a second language, namely, English.

EMI is growing very popular in the Indonesian universities on a daily basis. The advantage of utilising global opportunities is a priority for Indonesia's universities. Being able to access up-to-date information, either through printed materials or online, as well as being able to engage in international dialogue is critical for those institutes. Thus, EMI usage has been increased and results show that such methods have improved proficiency in the English language, Jusuf (2001). The basic goal is to be able to write and communicate in two languages. However, EMI in Indonesia is not as simple as it seems. All the aspects of EMI should be considered before making a decision to adopt it. The aspects that should be considered before adopting are opportunities of EMI, threats of EMI, problems faced by EMI and possible solutions.

English is also regarded as an important language in Korea. Korean universities have implemented EMI in order to improve their education level and meet the requirements of today's competitive environment. In the majority of Korean institutes, the lectures are conducted in the English language rather than using their native tongue, Kim and Shon (2009). EMI is being used in mostly higher level education courses such as engineering and science. English is necessary for maintaining international dialogue and for keeping pace with the changing standards of the industry. EMI is widely integrated in to the syllabus of engineering in Korean universities. EMI is being implemented in such a way that the students can increase their knowledge of the language as well as the subject content. As a result, by providing sound knowledge regarding the language, EMI courses in Korea are improving the quality of education given at those institutes, Kim and Shon (2009). Nonetheless, Korean universities have had some difficulties while implementing EMI. One major problem was the shortage of lecture material. Some instructors did not have a robustly proficient knowledge of English. In such cases the instructors were limited to the available content and could not give examples or references related to the topic. This resulted in some students misunderstanding lecture content.

With time, though, EMI implementation has improved and has been an overall success. The reason for this high usage of English in the lectures is because educational institutions in Korea are determined to meet the standards of international universities. Whilst there have been problems in the past, the advantages are presently numerous to the point where students now graduating can meet the global industry standards, Kim and Shon (2009).

3.2 Europe

The proposal to use EMI at Dutch universities was first introduced in 1990 Hagers (2009). Efforts are being made to improve the quality of teaching by increasing the level of English language instruction. At first, the level of higher education in Netherlands was not impressive enough to convince people from other countries to enrol in Dutch universities, De Wit (2002). The reason for the low popularity of the Netherlands's higher education institutes was mainly the language problem. Dutch was the sole language being used in those institutes, a language which many foreigners are unfamiliar with.

After observing the emerging competitive environment, these universities started to introduce courses that helped in improving the level of English language. Higher education institutes also

started introducing courses that were being taught in international standard. The steps taken by the Dutch helped improve the overall level of education and eventually aided in their integration with international educational institutions. The Dutch institutes have implemented the EMI in their educational systems and now they are giving priority to English in high levels of education. EMI is now also being implemented in other European countries like Denmark, Norway, Finland, Germany, Austria and Sweden, De Wit (2002).

4. IMPLEMENTING EMI IN ARAB ENGINEERING EDUCATION

Most engineering education students in Arab countries have learned English as a subject since the age of twelve in high school, and have continued learning the language until on average twenty three, Zughoul (2003). However, implementing EMI in Arab engineering education by using the immersion method is not in use. In this method, the language is not the subject of instruction, but rather is the vehicle through which subject areas are taught. Most immersion programs include math, science, social studies, and health taught in the target language, Chamot and El-Dinary (1999). A study by Al-Jarf (2004) in some Arab countries showed that 96% of Jordan University students and 82% of King Saud University believe that EMI is more appropriate for engineering education, medicine and science.

4.1 Total immersion.

Total immersion programs are common in areas in which students encounter bilingual and bicultural experiences on a daily basis. For example, many schools in Canada have total immersion French programs for English speaking students, because English and French are both official languages in that country Bostwick (2003). The general lack of English language proficiency and communication among students and teachers in Arab higher education system, Rababah, (2003) and Al-Jarf (2004) and high cognitive skills required for higher education tasks would make total immersion hard to implement. Therefore, partial EMI is a viable option, Jusuf (2001).

4.2 Partial immersion.

Partial immersion programs dedicate about half of the class time teaching the subject matter in the target language. Reading, writing, and spelling are taught in the students' native language, while the other subject material is taught in the second language, Chamot and El-Dinary (1999).
According to Bostwick (2003) students in partial immersion programs are expected to become proficient in the second language to a lesser extent than students who are in total immersion classes. Nonetheless, they are still expected to become proficient in the subject matter appropriate to their grade level, comparable to students who receive instruction in their native language. Students in partial immersion classrooms are also expected to gain a heightened understanding and sensitivity for the other cultures with which the target language is associated, Jusuf (2001).

5. CONCLUSION

Globalisation has made the world a global village. To achieve a high standard of engineering education in Arab countries, new technologies and an updated syllabus must be implemented. EMI is an innovative bilingual method, which influences general proficiency in English language and can improve engineering skills in the Arab world. EMI is still a new method, but one which will become more widespread. It will prepare professional engineers to a higher standard, and ultimately will help improve the quality of life in the future. Partial immersion program is the best option for implementing EMI in engineering study programmes in the Arab world. For now, the limitations of English language use amongst students' means that EMI will need to proceed on a smooth, step by step basis.

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