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Integrating Soft Skills in the Teaching of Hard Sciences at a Private University: A Preliminary Study

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ABSTRACT

This paper presents a study conducted in aprivate university in Malaysiaspecialisingin Engineering and Technology studies. The purpose of this paper is to discuss the preliminary findings of a study which examined to what extent the soft skills are being integrated in the teaching of Engineering courses by addressing the teaching approaches and examining the soft skills that are being emphasisedby lecturers. This study employed a mixed-method approach in data gathering, using questionnaire survey, group interviews and review of documents. The results show that the lecturersemphasised the following skills the most: communication skills, critical thinking and problem-solving skills and lifelong learning ability. The results also reveal that the teaching approaches most employed are cooperative learning, followed by problem-based learning and the teacher-centered approach. This paper concludes with recommendations on enhancing the effectiveness of teaching delivery in integrating soft skills in the teaching of Engineering courses.

Keywords: Soft skills, hard sciences, engineering, technical skills

INTRODUCTION

It is the aspiration of the Malaysian government to produce graduates who are well-rounded and well equipped with both technical and nontechnical skills. The government has been very concerned with the problem of unemployed graduates, an issue which has been widely discussed in recent times. One of the major causes of this situation has been identified asbeing the lack of non-technical knowledge or soft skills among graduates; this, in fact, appears to be a global issue (Kamsah, 2004). Soft skills are among the most crucial skills of the

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21st century that students need to acquire in order to meet the challenges of the modern age. These skills are a set of personal elementsconsisting of communication skills, problem solving, team working, critical thinking, leadership, management skills, lifelong learning ability and interpersonal skills. Thus, there is growing demand for graduates to be equipped with more than just technical skills.

In Malaysia, Engineering is one of the subjects under the hard sciencesthat ispopular among students who excel in their studies and who are seen as potential leaders of the nation in the future. Several studies indicate thatEngineering graduates do not lack technical competency but rather lack competency in soft skills that would enable them to use their technical skills most effectively (Aziz *et al.*, 2005; Kamsah, 2004).

Many studies have been carried outin Malaysian public universities on how to enhance soft skills among students and the teaching approaches employed in teaching specific courses (Abdullah & Aini, 2007; Ahmad Hadi, 2007; Thamer *et al*., 2007). However, there has been no in-depth study conducted on how soft skills are implementedin a private higher institution in Malaysia. Hence, this study seeks to examine to what extent soft skills are being integrated in the teaching of technical courses by addressing the teaching approaches and examining skills that are being emphasised most by lecturers teaching technical courses ina private university in Malaysia. In addition, the study addresses the issue of whether there is congruence in the lecturers'and students' perception of the integration of soft skills in the teaching and learning of technical courses. The purpose of this paper is,therefore, to discuss the preliminary findings of the study.

BACKGROUND

The main purposes of education are the holistic development of character and capabilities, the acquisition of specific skills, the realisation of intellectual, physical and spiritual potential and the training of human capital. Therefore, the Malaysian Ministry of Higher Education (MOHE) has produced a profile of the desired human capital based on three principles: knowledge, personal and interpersonal elements (Hazadiah *et al*., 2008). Not all graduates will be able to demonstrate excellence across all elements upon graduation. Nevertheless, higher education institutions must ensure that their teaching resources are in placeand must revamp programmes and systems and re-engineer learning processes to develop these elements in all students. These initiatives signify the importance of teaching and learning in the transformation of the Malaysian education system.

Malaysia's economy must remain robust and sustainable in order to face the challenges of being part of a global economy. Thus, according to the World Bank, there is a need for an innovative, knowledge-based economy which integrates science, technology and engineering into the production process (Hazadiah *et al.*, 2008). Consequently, one of the fields of studies

that is important for the development of the country is engineering. In Malaysia, the study of Engineering is usually taken up by students who excel in academic studies. Most of the time, these are the students who rank among the crème de la crème of the country, and they are seen as the future leaders of the nation. Therefore, the role of Malaysian engineers in the development of industriesand infrastructures and ensuring the general well-being of the country cannot be underestimated. According to Aziz *et al*. (2005), many industry practitioners perceive that locally trained engineering graduates are strong in their technical skills but lack in nontechnical or soft skillsthat are necessary for top management or leadership position. Megat Johari *et al*., (2002) further states that this lack in nontechnical skills has been one of the factors contributing to the dilemma that engineers have been left out of top leadership positions in the development of the country. As such, it is vital to integrate soft skills in the teaching and learning of engineering courses. This could further enhance the students' ability in nontechnical skills so that Malaysia may produce well-rounded engineering graduates who canhelp realsze the government's aspiration to produce human capital with first-class mentality.

Soft skills are also known as the personal attributes that enhance an individual's interactions, job performance and career prospects (Paajanen, 1992). They are broadly applicable and sometimes divided into two categories i.e. personal attributes and interpersonal abilities. Personal attributes consist of optimism, common sense, responsibility, a sense of humour, integrity, time-management and motivation. Interpersonal abilities consist of abilities like empathy, leadership, communication, good manners, sociability and the ability to teach. One basic underlying theory of soft skills comes from the theory of multiple intelligences developed by Gardner (1983). He suggested that individuals have different kinds of intelligences, and proposed that there are eight intelligences, namely, musical, interpersonal, intrapersonal, logical-mathematical, bodily-kinesthetic, spatial-visual, naturalistic and linguistic intelligences. Musical intelligence is the ability to use rhythm and sounds to illustrate and communicate creative thinking, while bodily-kinesthetic intelligence helps people to use the body to express ideas and feelings which allows for nonverbal implications. Spatial intelligence deals with the ability to form metal images of concepts and personal experience and transform these images into personal meaning and applications, while naturalistic intelligence deals with the ability to make distinctions between the natural and artificial dimensions of things in the world. Interpersonal, intrapersonal and linguistics intelligences deal with the ability to communicate effectively. These intelligences support soft skills elements like communication ability, leadership, creative thinking as well as analytical and critical thinking.

Soft skills are complementary to the hard, technical skills and are an advantage to any Engineering graduate seeking

employment. Ziegler (2007) finds that as current and future Engineering students become socially responsible and are able to fit into a changing environment, new skills are required due to even more changes such as, for instance, technological development. Hence, a new issue confronting Engineering educators today is how to best ensure that graduates will continue to bring value to the marketplace. In educating and training engineers in a rapidly changing technology-driven, borderless century, educators must develop approaches for students to be proactive, versatile and global in outlook (Mohammed & Zulkipli, 2005). In addition,Engineering students of the new millennium must be able to comprehend and solve problems from different dimensions and perspectives. Shuman (2005) emphasises that the mastery of soft skills combined with the ability to innovate willadd sufficient values to Engineering graduates. For continuing skill development through lifelong learning that prevents technical obsolescence in the global context, mastery of soft skills is critical. Hence, globalisation, which now includes the engineering profession, is forcing educators to reconsider firstly, the role of Engineering graduates in the global marketplace and secondly, the curriculum required to meet that role.

A management development trainer and consultant suggests that every university in Malaysia should employ an integrated approach in developingsoft skills in graduates so that their employabilitymay be enhanced (Yaqin, 2009). This, he continues, is due to the fact that most Malaysian tertiary institutions are lacking in this approach. He further recommends that this can be done by using a holistic approach by embedding soft skills in the curriculum. The director of the Industry Relations Division, MOHE, concurs with this suggestion in saying that more cohesive approach will yield better results. This idea supports the point made by Hazadiah *et al*. (2008) when they emphasise the need for Malaysia to reengineer the teaching and learning in Malaysian higher education for the development of human capital through a holistic approach.

METHODOLOGY

This preliminary study was conducted in a private university in Malaysia which emphasisesengineering and technology. In other words, the university offers programmes in Engineering and Technology only. Students are required to fulfil 9 credit hours of the courses under the National requirement such as Islamic or Moral Studies and Malaysian Studies, 14 credit hours of the University requirementthat include English courses, social sciences and humanities courses, 23-31 credit hours of common Engineering courses like Health Safety and Environment, Calculus and Engineers in Society, 79-84 credit hours of their major courses and 9 hours of major electives courses. Hence, Engineering students are required to take technical as well as nontechnical courses.

To find out how the integration of soft skills is being implemented in the teaching of technical courses in this private

university, the following research questions are addressed: (RQ1) Which attributes of soft skills are being emphasisedmost by the majority of the lecturers? (RQ2) What teaching approaches are being employed by the majority of the lecturers? (RQ3) Is there congruence in lecturers' and students' perception of the integration of soft skills in the teaching and learning of technical courses? This is to see whether the lecturers' and students' views on the integration of the soft skills elementsareshared. This study's multi-method approach in data gathering includes theuse of questionnaire survey, group interviews and review of documents. The documents used for this study are the course syllabus of technical courses in Electrical and Electronic Engineering (EE), Civil Engineering (CV), Chemical Engineering (CE) and Mechanical Engineering (ME) to further look into the learning outcomes (LO).

The survey questionnaire method is used as the main method for data collection. Two sets of questionnaire have been developed, adapted from studies conducted by Kamsah (2004), Ziegler (2007) and Mohd Yussoff (2008). The first set is for the lecturers, while the second set is for the students. Both sets are divided into 3 sections; Section A is on the respondents' background information. For the set of questionnaire given to the lecturers, seven demographic items are constructed to provide understanding of the background information of the respondents participating in this study. They are 1) courses taught 2) teaching experience 3) highest educational achievement 4) engineering programme 5) gender 6) ethnicity and 7) whether thestudents have experience of working in the industry. The set of questionnaire for the students contained four demographic items which aere 1) year of study 2) programme 3) gender and 4) ethnicity. **S**ection B is on the importance of soft skills to the respondents and the approaches employed in teaching. The set of questionnaire for the lecturers focused on teaching approaches that the respondents employ in their teaching of technical courses. The items were generated based on the literature review carried out on the approaches taken to integrate soft skills in the teaching of technical courses in order to enhance students' ability in soft skills. This section also inquiresinto the understanding of the lecturers and students of the importance of soft skills by stating statements regarding the benefits of soft skills to technical students, the common perception pertaining to soft skills and the ability of students in soft skills. In addition, this section also delved into the soft skills elements that are being emphasised by the lecturers in teaching in order to ascertain which soft skills elements are being focused on as the most important and the least important to them. The set of questionnaire for the students focused on the students' perception of the importance of soft skills for them as future engineers. There is also a question which seeks their opinion on the effectiveness of soft skills being incorporated in some learning methods. The last section, Section C, is on the tasks emphasised by the lecturers to enhance

students' soft skills. This section is sub-divided into 6 parts with each part detailing the tasks to enhance each of the soft skills elements, namely, communication skills, critical thinking and problem solving skills, information management and lifelong learning ability skills, leadership skills, ethics and professional moral skills, as well as entrepreneurship and management skills. In the set of questionnaire meant for the lecturers, the questions require the respondents to answer how often they incorporate tasks or instructional activities that can enhance their students' ability in the detailed skills under the category of the 6 elements of soft skills that are under investigation in this study. On the other hand, the set of questionnaire for the students require them to indicate their perception on how frequently their lecturers incorporatein their teaching certain tasks or instructional activities to enhance students' soft skills ability.

In this study, group interviews are conducted with selected lecturers and students. According to Cohen, Manion and Morrison (2000), interviews enable the researcher to probe the learner's mind and ascertain what has been discovered from the analysis of the questionnaire. As such, the authors embarked upon interview sessions with the participants to further explore the students' views on the integration of soft skill in the teaching of technical courses. The interviews are based on participants' responses to the items in the questionnaire.

The 13 subjects that make up the sample of lecturersare teach engineering courses in the university. Theyare from the four engineering programmes offered in this university, namely, Mechanical Engineering (ME), Chemical Engineering (CE), Civil Engineering (CV) and Electrical and ElectronicsEngineering (EE). The lecturers are chosen because the study looks into the integration of soft skills in the teaching of technical courses focusing on Engineering courses and students. The lecturers taken as respondents of this study are those who are currently teaching and not on study or sabbatical leave. This is because the researcher is looking to collect data that are up to date. The summary of the demographic information of lecturers is provided in Table 1.

TABLE 1
Demographic Information of Lecturers

Demographic items	No
Gender	
Male	10
Female	3
Educational achievement	
PhD	8
Master	5
Engineering programme	
EE	4
ME	3
CE	3
CV	3

The subjects in the sample of student responses are 20 final-year Engineering undergraduates from the same 4 Engineering programmes. It is assumed that as final-year students who are at the end of their study,the respondents would have developed adequate soft skills ability. Final-year students are presently required to enrol in at least one

course for a degree credit in the fourth year of study. Table 2 presents the summary of demographic information on the students.

TABLE 2
Demographic Information of Students

Demographic items	No.
Gender	
Male	13
Female	7
Year of study	
Year 4, Semester 1	10
Year 4, Semester 2	10
Engineering programme	
EE	6
ME	5
CE	5
CV	4

Wiersma (2000) suggests that a pilot study "is done with a limited number of individuals, usually five to ten, but seldom more than twenty." (p.165). As such, the number of lecturer and student respondents obtained in this preliminary study is considered sufficient in order to conduct a preliminary study. For this preliminary study, 5 lecturers and 6 students were selected for the group interview with at least one representative from each Engineering programme. The lecturers formed one group and the students another group.

DATA ANALYSIS

To answer the first (RQ1) and second (RQ2) research questions, responses to the items in the questionnaire are calculated using frequency distributions and percentages. For the third question (RQ3), to gauge whether there is congruence between the perception of the lecturers and that of the students, the statistical test chosen to analyse the datais the chi-square test because the level of measurement of the questionnaire is at most, ordinal. The responses on the questionnaire, which are classified as 'always' (A), 'often' (O), 'sometimes' (S), 'rarely' (R) and 'never' (N) might be thought to fall on a continuum reflecting frequency of soft skills integration. Unlike the distances between the points 1, 2, 3, 4 and 5 marked on a measuring tool, which are equal distances of one unit each, the distance from A to O might be more than, less than or equal to the distance from O to S. In other words, the distance between the response categories are unknown and cannot be assumed as equal. The chi-square test is based on fewer assumptions about the data and thus, has broader generalisability. Due to this, the chi-square for test of independence is chosen.

The null hypotheses tested in answering the third research question (RQ3) using the chi-square test are as follows:

1. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of communication skills in the teaching and learning of technical courses.
2. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of critical thinking and problem solving skills in the teaching and learning of technical courses.
3. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of leadership

skills in the teaching and learning of technical courses.

4. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of ethics and professional moralskills in the teaching and learning of technical courses.
5. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of information management skills and lifelong learning abilityskills in the teaching and learning of technical courses.
6. H_0: There is no significant difference in the perception of lecturers and that of students of the integration of entrepreneurship and management skills in the teaching and learning of technical courses.

The interview is transcribed and the responses of the interview are deliberated in the discussion section so as to explain the findings. The information gathered from the document review is also used to explain the results.

Reliability of the scale

Cronbach's alpha was used to measure the reliability coefficient that assessed the consistency of each part of the scale, which is divided into the 6 soft skills elements: communication skills, criticalthinking and problem solving skills, information management and lifelong learning ability skills, leadership skills, ethics and professional moral skillsandentrepreneurship and management skills. The reliability test is conducted on the 6 sections, and the results of Cronbach's alpha are shown in Table 3.

TABLE 3
Alpha Level of Soft Skills

Soft skills elements	Alpha
Communication skills	.88
Critical thinking & problem solving skills	.90
Leadership skills	.89
Ethics and professional moral	.89
Information management and lifelong learning ability	.80
Entrepreneurship and management skills	.95

RESULTS

In answering research question (RQ) 1 i.e. which attributes of soft skills areemphasised by the majority of the lecturers, the results showed that 100 % of the lecturers emphasisedcritical thinking and problem solving skillsand 84.7 % emphasised communication skills as well as information management and lifelong learning ability. These results ares ummarised in Table 4.

RQ2 focuses on the teaching approaches employed by the majority of the lecturers in integrating soft skills in their teaching of technical courses. The results reveal that the teaching approaches employed most are cooperative learning (about 77 % of the lecturers employed this method),problem-based learning (69.3 %) and teacher-centered approach (61.5 %). The summary of the results is shown in Table 5.

TABLE 4
Soft Skills Regularly Emphasisedby Lecturers in Teaching

Soft skills	%	Mean score
Critical thinking& problem solving skills	100.0	4.846
Communication skills	84.7	4.307
Information management and lifelong learning ability skills	84.7	3.923
Ethics and professional moral skills	61.6	3.692
Leadership skills	38.5	3.000
Entrepreneurship and management skills	15.4	2.307

TABLE 5
Teaching Approaches Regularly Employed by Lecturers

Teaching approach	%	Mean score
Cooperative learning	77.0	3.923
Problem-based learning	69.3	4.000
Teacher-centered approach	61.5	4.077
Project-based learning	46.2	3.307
Project-oriented and problem-based approach	30.8	3.000

Perception of lecturers versus that of the students

The third research question (RQ3) aims to find out whether there is congruence in the perception of lecturers and that of students towards the integration of soft skills elementsin the teaching and learning of soft skills. The results of the tests of the hypotheses are presented as follows:

1. Communication skills

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of communication skills in the teaching and learning of technical courses.

The p value is approximated to be .232. Since p>.05, the Null hypothesis is not rejected. Therefore, there is no evidence to conclude that lecturers and students have different perception towards the integration of communication skills in the teaching of technical courses. In other words, the lecturers' responses indicate that they do integrate communication skills in their teaching and the students concurwith this.

2. Critical thinking and problem solving skills

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of critical thinking and problem solving skills in the teaching and learning of technical courses.

The p value is approximated to be .026. Since p< .05, the Null hypothesis is rejected. The data thus conclude that lecturers and students differ in their perception towards the integration of critical thinking and problem solving skills in the teaching of technical courses. The data reveal that lecturers claim they do integrate critical thinking and problem solving skills in their teaching, with one lecturer even stating that he/she always integrates the skills. On the other hand, the students' responses show that the majority of the lecturers only integrate these skills sometimes or rarely.

3. Leadership skills

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of leadership skills in the teaching and learning of technical courses.

The p value was approximated to .044. Since p<.05, the Null hypothesis is rejected. The data thus conclude that there is a significant difference between the lecturers'and students' perception of the integration of leadership skills in the teaching of technical courses. The data show that the lecturers claim that they do integrate leadership skills in their teaching. However, the students perceive that the majority of the lecturers integrated the skills only sometimes and some, rarely.

4. Ethics and professional moralskills

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of professional moral and ethical skills in the teaching and learning of technical courses.

The p value isapproximated to be .074. Since p>.05, the Null hypothesis is not rejected. Therefore, there is no evidence to conclude that lecturers and students have different perception of the integration of ethics and professional moral skills in the teaching of technical courses. Thus, the data revealed that the majority of the lecturers claim that they do integrate self-awareness and ethical skills in their teaching but rarely do it, and the students have the same view.

5. Information management and lifelong learning ability

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of information management and lifelong learning ability in the teaching and learning of technical courses.

The p value is approximated to .120. Since p>.05, the Null hypothesis is not rejected. Therefore, there was no evidence to conclude that lecturers and students have different perceptions towards the integration of information management and lifelong learning ability in the teaching of technical courses. The data showed that the lecturers stated that they sometimes and often integrate this particular skill in their teaching and the students seemed to concur.

6. Entrepreneurship and management skills

H_0: There is no significant difference in the perception of lecturers and that of students of the integration of entrepreneurship and management skills in the teaching and learning of technical courses.

The p value is approximated to .033. Since p<.05, the Null hypothesis is rejected. The data thus conclude that there is a significant difference between the lecturers' and students' perception towards the integration of entrepreneurship and management skills in the teaching of technical courses. The data show that the majority of the lecturers rarely integrate the skills in their teaching, in fact, some statethat they never do it. On the other hand, the responses from the students point

out that the lecturers sometimes do integrate the skills in their teaching. Table 6 presents the summary of the results.

DISCUSSION

In analysing the results we found that the soft skills emphasised most in the teaching by the lecturers is related to the teaching methods that they employed. One of the teaching approaches is cooperative learning. Cooperative learning is a teaching method that involves students working in teams to accomplish the learning objectives. It is constructed around a kind of group-orientated classroom based on the belief in the potential of all students to succeed. Cooperative learning, compared with the traditional teacher-centred method, has many advantages to Engineering students such as positive interdependence, high retention, high critical levels, enhancement of teamwork skills, enhancement of the ability to solve problems and better interaction (Felder *et al*., 2000). Several studies have found that cooperative learning can help improve Engineering students' soft skills and overall performance (Felder *et al*., 2000; Khairiyah *et al*., 2004; Vijayaratnam, 2009). One of the lecturers who was interviewed in this study mentioned that she used this approach to make her class more interactive, to encourage the students to interact and to have shared responsibility on the outcome of their discussion. The following is her remark:

> *Actually the lecturers must create the environment. It depends so much on the lecturers who have to be interactive with the students. I usually give lecture for 30 minutes, then, I give them a problem on the board, then pair up and ask the students to solve the problem in pairs. I teach them not to be afraid if make mistake because it is a collaborative work, not only one person's work. Then I call them up to the front at random to show how they solve the problem, I don't ask for volunteers. I don't have problem to make them come to the front.*

Problem-based learningis another teaching approach employed most by the lecturers. In problem-based learning, the

TABLE 6
Summary of Results

Soft skill	df	Chi-square	p-value	Null Hypothesis
Communication	16	19.737	.232	Not rejected
Critical thinking & problem solving	15	27.415	.026	Rejected
Leadership	17	28.113	.044	Rejected
Ethics & professional moral	11	18.340	.074	Not rejected
Information management & lifelong learning	11	16.959	.120	Not rejected
Entrepreneurship & management	15	26.508	.033	Rejected

learners define the problem, explore and decide on means of solving the problemand then evaluate and present the solution. The problem is presented prior to learning while learning occurs during the problem-solving process. The learners take responsibility of their own learning when they define the problem and sub-problems, propose, implement and evaluate the solution and strategy, identify resources, manage time, manage themselves and others. They learn through experience and interaction with their peers and other role players. Thus, this teaching method requires students to think critically, enhance their lifelong learning ability when they relate the activities to real life, employ time management, learn to identify resources and enhance communication skills when they interact with others and present their solutions. As such, by employing problem-based learning, the lecturersemphasisemost on communication skill, critical thinking and problem solving skills and lifelong learning ability. Below are some of the comments given by the students during the interview on the skills that are emphasised by their lecturers in their teaching:

Student A

Most of the lecturers in my programme (ME), they give the project together with the presentationwhereby the students must answer the questions given by lecturers through the projects. This is one of the most (important) sources (ways) of the students to gain soft skills, like communication skills and at the same time their critical thinking skills.

Student B

There are many types of projects like problem solving, build something or examine something and at the end of the project (work) we are required to express what we have done, what we want to show (outcome of project) to the class. That's how project presentations help us (enhance communication skills)…

Student C

…in working on the assignment given by the lecturers sometimes we have to search for the information ourselves which are not in the textbook. We have to search in the internet, or go to the library or sometimes we have to speak to other people who know more about it (the topic).

The students' comments indicate that some types of tasks given by the lecturers do help them to enhance some soft skills like communication skills, critical thinkingskills and problem solving skills as well as information management and lifelong learning ability skills. The review of selected OBE documents also shows that communication skills, problem solving skills and critical thinking skills and lifelong learning ability skills are integrated through the assignments like project workthat carry between 10 to 20 & of the assessment marks. Other than the evaluated activities, the

students also do group discussions in class to discuss certain issues in some given topics or to solve problems. One of the lecturers mentioned this mode:

> *Sometimes I will make the students discuss in groups on certain topics. I don't do this for every topic though. After the discussion the students have to present to the class the outcome of their discussion.*

The teacher-centered approach is employed by the lecturers who are teaching large classes in which the contentsof the course are delivered through lectures. There are concerns that teaching approaches other thanthe lecture takeup a lot of time, and there will not be enough time to cover the syllabus. As the lecturemethod has been efficient in covering the syllabusall this while, some are of the opinion that it is pointless to turn to another method especially since it would be difficult to integrate soft skills when they are required to cover the content of the whole semester's syllabus. They, therefore, seem to support the teacher-centred approach more.

> *...course syllabus sometimes is too lengthy where the lecturers have insufficient time to integrate the soft skills in technical knowledge delivery.*

> *Some of the technical courses especially engineering core subjects are 'highly technical' in nature. These are required and necessities to become professional engineers. Most of them are involved with 'technical mind challenge'. So it's not easy to blend all soft skills needed.*

According to Khairiyah *et al*. (2004), lecturers need to understand that there is a need to change because the world today is far from what it was even a decade ago. This researcher believes that in order to impart knowledge or skills to students, lecturers must set a good example. In order to enhance students' lifelong learning ability, lecturers must possess the ability too, and one of it is to be able to learn from and to accept changes. Thus, the lecturers should want to change their teaching approach for the benefit of their students as well as themselves.

The views of lecturers and students in the integrationof critical thinking and problem solving skills, leadership skills and entrepreneurship and management skills differ. This may be because the lecturers do not communicate to the students their intention of integrating those skills in their teaching. Thus, students might not see or be aware that these skills are integrated in the teaching. Woods *et al*. (2000) highlighted that there are eight basic activities that could be carried out in any classroom for soft skills development and one of it is that the instructors must communicate the importance of the skills they wish the students to develop. Lecturers must not assume that they students should know and be aware of the skills especially in

undergraduate classes. We reckon this is what may have happened in the case of this result.

IMPLICATION OF STUDY

This study contributes to the pedagogical implication on the teaching of soft skills in technical courses. The findings suggest that students sometimes are not aware of the intention of the lecturers to integrate soft skills in their teaching. Often times, students overlook learning objectives in the syllabus, while it is assumed that students have read through them. Therefore, the learning outcomes of each course should incorporate the development of soft skills and this must also be articulated through stating each clearly in the Learning Outcome (LO) of the course to give a sense of purpose to the students. This is also to ensure that proper alignment is set in terms of understanding what soft skills really are. It must be made known to the students that soft skills can also be acquired while learning technical skills. Mitchell (2011) suggests providing a syllabus quiz and a brainstorming session with the students at the beginning of the semester to help students understand the objectives. The methods of delivery should also emphasisestudent-centred approaches rather thanthe teacher-centred approach. Nevertheless, as stated by Felder *et al.* (2000), a combination of both approaches would be better.

CONCLUSION

In summary, the study finds that the soft skills elements being emphasised most in their teaching by lecturers of Engineering programmes in a Malaysian university specialisingin Engineering and Technology are communication skills, critical thinking skills and problem solving skills as well as lifelong learning abilityskills and information management skills. This finding is relevant to the teaching approaches employed by the majority of the respondents which are cooperative learning and problem-based learning as these approaches focus on the skills mentioned earlier. In testing the hypotheses to find out whether there are any differencesin the lecturers' and students' views on the integration of the soft skills elements, this study finds that the two groups differ in their views on the integration of critical thinking and problem solving skills, information management and leadership skills as well as entrepreneurship and management skills. Since soft skills are very important for graduates to acquire to secure employment, it is imperative that the skills be integrated in teaching especially in technical courses so that the graduates are well equipped with technical skills (hard skills) as well as soft skills.

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