

Motivational Factors of Professional Engineers and Non-Professional Engineers in Applying for License as Professional Engineer: A Comparative Study

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Abstract

All engineering faculties in Malaysia are required to have at least three academics who have engineering competency for each program. Having an engineering competency means academics has obtained the compulsory endorsements from the Boards of Engineers, Malaysia, BEM. Upon approval, academics seeking such competency could carry the suffix Ir. to their names and are called Professional Engineers (PEs). In some developed countries, it is known as Chartered Engineer. Efforts in increasing the number of PEs should be taken seriously by all parties to meet these criteria. This paper presents the perceptions of academics about being a professional engineers and prospect applicants while preparing for PE certification. Academics mostly from the Faculty of Engineering and Built Environment (FEBE), Universiti Kebangsaan Malaysia (UKM) participated in the study. The surveys were grouped into two, namely, 1) academics who have PE qualifications and 2) academics who do not have PE qualifications. The respondent for this study are selected randomly. The response rate for the both group is around 30%. In the first survey, results show that PEs strongly acknowledge that this title improve quality of their careers as well as boosts their confidence among the society. These results also show that by being part of the registered professional body, PEs have bigger connections in the wider society, beyond academic field, and more interestingly receive more attentions and feel more respectful. In the second survey, responses in the first category indicate that lecturers have little intention to submit an application because the lack of department supports in term of remunerations and direct fee allowances. In the second category, lecturers blame procedures, but it is the eligibility in the third category that finally makes the cut; a large percentage of lecturers do not have an industrial attachment. Technically, they are ineligible to apply for the professional examination. This issue is also related to the unavailability of mentor at their work places. It is our views that departments should respond appropriately such as to award lecturers with remunerations or sponsor some of the fees. The department should also address the eligibility issue.

Keywords: professional engineer, accreditation, engineering, BEM, IHL

1. Introduction

To prove their worth, academics have to obtain recognitions from various fields, in addition to their own field. The job scope of an academics involves not only teaching but also research, community services, administration and consultation works (Mohd Kosnin & Male 2009). Therefore, to claim worthiness, lectures have to be recognized by the appropriate bodies from these fields. One of the influential bodies, as far as engineering lecturers and faculties are concerned, is the BEM. Recognitions by BEM are necessary because of the accreditation criteria is set by the Engineering Accreditation Council (EAC), a BEM-delegated body to accredit engineering programs in the country.

There is a great need to make academic field relevant to the industry especially while the nation is preparing towards a developed nation within the next decade. Harun et al. (2012) noted that academics with the title Professional Engineer (PE) are important at the Institutions of higher learning (IHLs) because they can link industrial needs to IHLs through lectures, case studies, and course content. The Board of Engineers Malaysia

(BEM) has communicated through a letter that all engineering faculties should have at least three academics with PE qualifications for each engineering program. This criteria will be enforced by 2015 (LJM 2012).

IHLs provide learning experiences that can develop the skills and knowledge of future engineers (BEM 2003). PEs at IHLs accustom their students to the real world of engineering (Ab Karim 2008). Academics with PE qualifications not only benefit from the title but also are highly appreciated by their students (Engineering Council 2012). Fink et al. (2005) stated that faculties would become more successful in teaching students when majority of their faculty members achieve high levels of professionalism, knowledge, and competency in their field. Therefore, the head of the engineering department must implement necessary steps to achieve the goal set by the EAC.

Several IHLs have taken the initiative to reward academics who have obtained the PE qualification. For example, Technical University of Malaysia Melaka (UTeM) provided a scheme in which the university shoulders the travel allowance and application fees of academics attending courses related to engineering. UTeM also delegates the role of mentor to responsible PEs, urging them to assist prospective academics who wish to apply for PE qualification. These incentives can motivate academics to improve their competency (Pekeliling UTeM 2010, Chandra et al. 2011). In addition, exposure to the PE application and support from the management and colleague is also among the factors that can motivate academics to achieve their target (Mohd Kosnin et al. 2009).

Aside from providing guidance to engineering programs at IHLs, PEs also improve the quality of research at IHLs. Research is no longer focused on the discovery of new theories. Current research focuses on the application of the discovered theories to improve existing systems. Clearly, academics with PE competency can help improve the link between IHLs and the research community. In the first part, we present the views of these academics who have already obtained PE qualifications.

In the second part, we analyze the difficulties faced by lecturers who seek to obtain this qualification. An academics cannot easily apply for PE qualification. Academics have to undergo many processes and meet technical criteria. This portion collects perceptions among academics regarding factors and constraints that impede their application for PE qualification. For these purposes, surveys and interviews were conducted at FEBE, UKM in the middle of 2012 and early 2013.

2. Method

Semi-structured surveys and interviews were used to obtain overall information on PE qualifications among academics. Questionnaires were developed based on the requirements and practices found in the literature and based on the inputs from academics. This study was conducted in the middle of 2012 and early 2013 at FEBE, UKM. Respondents were collected from mostly four main departments of FEBE namely:

- a) Department of Civil and Structural Engineering with two programmes – structural and environment
- b) Department of Electric, Electronic and System with three programmes – Electric and electronic, Microelectronic and Communication and Computer
- c) Department of Chemical and Process with two programmes – Chemical and Process and Biochemistry
- d) Department of Mechanical and Materials Engineering with two programmes – Mechanical and Manufacturing

The survey was conducted by using a convenient Google application. The respondents took less than 5 min to complete the survey. A five-point Likert scale was used for the questionnaires, in which 1 = strongly disagree, 2 = less disagree, 3 = neutral, 4 = do not agree, and 5 = agree. Invitations to complete the survey were sent via e-mail.

2.1 Development of Questionnaires

Questionnaires were developed based on the requirements and practices found in the literature and based on inputs from researchers. The general rules provided by Dual Factors Theory or Herzberg's Hygiene and Motivational Factors. This practice is based on literature studies done by a few researchers on different areas, but with similar goal to study on motivational factors and job satisfaction (Chandra et al. 2011, Lambrou et al. 2010, Mark & Robert 1998). This study focused on two groups of academics, namely, 1) academics with PE qualifications and 2) academics with no PE qualifications.

- (i) Questionnaires for academics with PE qualifications

The items for this questionnaire were divided into six main categories (Table 1).

Table 1. Factors that motivate academics to apply for PE

Main components	Factors
Self-improvement	Improve the quality of career Improve technical capability Improve soft skills Increase confidence to succeed in own field Increase confidence in self-ability Increase confidence to face and help the society
Greater opportunity in career	Enhance portfolio by being a director Increase opportunity to acquire higher income through consultancy work Increase chances of applying for a research grant Improve chances of career promotion
Other opportunities	Acquire more friends from the industry Obtain the power to influence others Receive more attention from others
Requirement	Meet accreditation requirement Meet requirement for consultation work
Self-initiatives	Obtain a better title Apply just for fun
Human resource management	Obtain financial support from management

i) Questionnaires for academics with no PE competency

For this section, there were four main categories, namely, (i) human resource management, (ii) procedures to apply for PE qualification, (iii) application prerequisite, and (iv) self-motivation. All these components could be divided into a number of relevant factors, as tabulated in Table 2.

Table 2. Factors that delay PE applications

Main components	Factors
Human resource management	1. Lack of exposure to the application 2. Lack of support from the management and colleagues 3. No incentives from the management
Procedure to apply for PE	4. Expensive fee 5. Complex and varied application flow 6. Time-consuming procedure 7. Difficult procedure
Application prerequisite	8. Ineligibility for application 9. Insufficient of practical experience 10. Insufficient industrial attachment 11. Absence of a suitable mentor among Pes 12. Absence of Pes to verify drawings, calculations, and reports
Self-motivation	13. Ever failed? 14. Fear of failure 15. Inability to see the importance of becoming a PE

2.2 Semi-Structured Interview

An interview was arranged between the researcher and the selected academics after collecting the findings from the questionnaires. An interview was conducted in early 2013. Academics were selected randomly because of time constraints. The respondents were asked during the interview to provide feedback on questionnaire findings.

3. Results

i) Questionnaires for Academics with PE Qualifications

Figure 1 illustrates the survey findings among academics with PE qualifications. More than 60% of the respondents perceive that the recognition helps them in their careers, technical skill, soft skill, and confidence level. Interestingly, all of the respondents believe that the PE qualification helps their interactions with the society better.

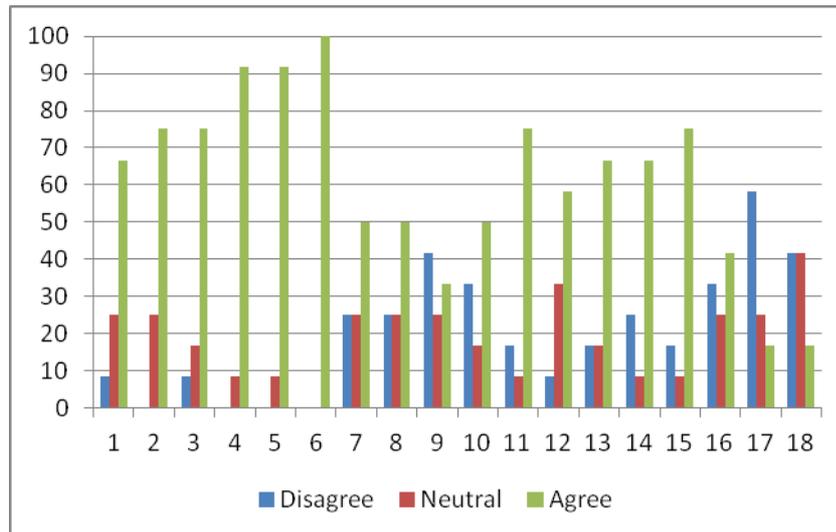


Figure 1. Motivating factors of becoming a PE

In the area of career opportunity (Factors 7 to 10), approximately half of the respondents agreed that PE qualification can help them become a leader or a director in a company or any registered body. In addition, these respondents perceive that PE qualification can increase their salary through consultancy work and will provide them greater chances for promotion. However, the majority of the respondents disagreed in the scenario about having the upper hand or advantage in obtaining a research grant.

Factors 11 to 13 highlight other opportunities for PEs. Most of the academics (more than 70%) agreed that the PE qualification could help them obtain friends or partners from the industry. The respondents also believed that this title helps them gain power to influence others and help them acquire more attention from others.

The requirements for PE application can be divided into two factors: accreditation requirement (14) and the need for consultancy work (15). A minority of the respondents expressed that they did not apply for PE to meet the accreditation requirement of EAC. This could be affected because some respondents obtained their titles before the EAC formalized the requirement of minimum three PEs for each engineering program. Some of the respondents agreed that the PE qualification is needed for consultancy work.

Almost equal percentages were observed for respondents who agree and disagree with Factor 16, which highlights enrichment of the title. Majority of the respondents disagree that the PE qualification is obtained just for fun (Factor 17). In terms of human resource management, approximately 40% of the respondents disagree and feel neutral about the financial support given by the management. This result is similar to the findings obtained in academics with no PE qualifications.

ii) Questionnaires for Academics with no PE Qualifications

Figure 2 shows the factors impeding academics from applying for PE qualification. Over 50% of the respondents agreed that they had encountered difficulty fulfilling the criteria while applying for a PE qualification. This item is always highlighted in department meetings. In addition, a number of short and special courses are also organized for academics to help them understand the procedure for PE qualification. About 63.4% of the respondents agreed that the lack of encouragement from colleagues and management as a factor delaying their application. However, according to the views of, the key factor in decreased PE application is the absence of appropriate remuneration from the management (56.7%). For this item, nearly half of the respondents selected “strongly agree” in their response. These findings are consistent with Herzberg’s theory, which states reward as

one of the main motivating factors in the job because this factor provides satisfaction to the worker him/ herself (Mark & Robert 1998; Herzberg 1959).

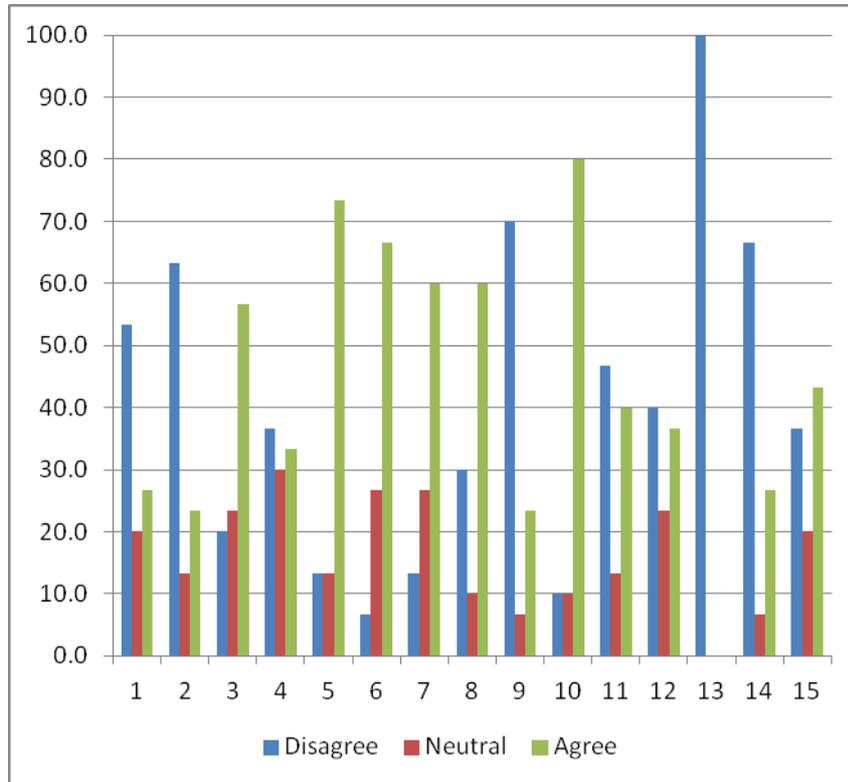


Figure 2. Factors causing delay in PE application

Factor 4 is associated with the application procedure. Some academics are concerned with the application fees. The cost of PE application is subjective because some academics may perceive the cost as expensive, whereas others may perceive the process as reasonable. In fact, the academics involved consist of all grades of posts, ranging from lecturers to professors. Thus, their perceived range of acceptable payment (RM 500 to RM 1000) is based on their financial ability.

A majority of the respondents (over 67%) agreed to include sequence-5 complex and diverse application as factors that hinder their PE application. Figure 3 illustrates the PE application. The flow chart in Figure 3 begins with students graduating from accredited IHLs and ends with graduates becoming qualified Pes. This flow chart is based on the Registration of Engineers (1967). Some academics at local universities are from universities recognized by BEM; therefore, these academics are not required to undergo a complicated route to achieve their PE licenses.

After having gained over three years of experience and attended in professional development programs, lecturers can apply for the Professional Assessment Examination (PAE). Factors 6 and 7 reveal similar results, in which more than 50% of the respondents agreed to the statement “the application procedures take a long time” and “the application procedures are poor.” Figure 3 denotes that the PAE and the documents required for PE application are factors affecting the delay in PE application. Academics interested in applying for PE qualification need to submit the following documents: (i) report of training and experience, (ii) report logbook (academics should acquire mentors who are also Pes for experience validation), and (iii) drawings and calculations certified by a PE.

About 33% of the respondents agreed to Factor 8, which denotes that applicants fail to acquire PE qualification because they do not meet the requirements of the PE application. Factor 9 demonstrates that a majority of the respondents has completed the three-year practical training required by BEM. About 80% of the respondents agreed with Factor 10, thereby denoting that insufficient industrial attachment delays the PE application of academics. Most lecturers begin their careers in academia; hence, they gain experience in the industry through

undergoing industrial attachments for periods ranging from six months to one year. BEM requires academics to have an industry experience of at least one year. However, given the urgent need for research and teaching, lecturers cannot obtain sufficient industry internship. Some of the respondents expressed that they possess sufficient experience in the industry, however, they did not register with BEM when they started these attachments. Consequently, their experiences were not considered valid in the calculation of BEM for PE eligibility.

Factors 11 and 12 have similar trends. Factors 11 and 12 denote that a lack of qualified Pes to mentor the hopeful applicants and to verify the drawings, calculations, and reports of these applicants contributes to the delay in PE applications. However, this case is not true in all departments or fields. Nevertheless, about 40% of the respondents agree with the importance of Factors 11 and 12 in delaying PE applications.

The last component is related to the experiences of respondents. Factor 13 demonstrates that respondents have never been interviewed by the body responsible for managing the professional interviews, namely, the Institution of Engineers, Malaysia (IEM). Therefore, the respondents have never 'failed' in their PE applications. Factor 14 demonstrates that a majority of the respondents (almost 65%) are unfeared for failure. Factor 15 shows balanced views. Respondents were asked whether they think that the PE qualification is beneficial in their careers. The respondents who agreed (over 40%) with the above statement are those who are always involved in negotiations, whereas the respondents who did not agree (35%) considered themselves in safe zones and were comfortable with their current career.

The EAC recently required faculties to have at least three academics with PE for each program. Therefore, faculties and academics need to adopt a proactive approach in meeting the conditions imposed by the EAC. The factors described in this study should be considered to achieve those goals. Universities such as UteM should also be consulted to improve the proposed approach.

Most respondents agreed that the engineering faculties should provide additional incentives for academics with PE qualifications. An opportunity for industrial attachment should be provided to those academics who lack industrial exposure. A typical academic is not concerned with earning a PE qualification because he or she has another important Key Performance Index (KPI) to accomplish. The KPI involves research, teaching, and community services. Consulting various parties, particularly those from the industry, may help academics become more confident in achieving a PE qualification. However, academics regard that the PE qualification does not help them obtain research grants, which is highly significant for them to perform well in their career.

4. Conclusion

The components of human resource management clearly demonstrate that lecturers at FEBE, UKM take a lot of time in applying for PE because they are engaged with other criteria to fulfill their KPI. Respondents stated that difficult and complicated procedures in PE application hinder their PE application. BEM and IEM require applicants to undergo a standard procedure for PE application to maintain high quality standards within these organizations, just like other respected organizations. In addition, the academics at FEBE should balance their time in fulfilling UKM official duties to obtain free time to complete the survey documents needed for PE application.

Results show that a lack of the industrial attachment required by BEM is a key factor in delaying PE application. Therefore, FEBE should assess this matter in a more objective and structured way by allowing industrial attachments to aspiring PE applicants. Academics also need to create a network of research and consultation with the industry. Academics must also have at least one PE that can confirm the relevance of the project reports, design drawings, and calculations submitted by the PE applicant.

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