Mastery of leadership skills among mechanical engineers from the industrial Perspective

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Abstract. Leadership is an essential element of all types of work. This skill is also a focus in the field of Mechanical Engineering. Mechanical Engineers are said to be less familiar with leadership skills, and this will negatively affect the reputation of an industry. They aimed of this study to look at the extent of the need for leadership skills among Mechanical Engineers. The quantitative method used to obtain the study data involves 300 respondents who need to answer the questionnaire. The results show that the elements of leadership skills are at a very high level of need of 88.50%. Therefore, graduates in Mechanical Engineering should be more prepared to prepare for the workplace.

1. Introduction

Another essential skill is related to personality skills with interpersonal skills involving leadership skills [1,2]. Leadership is one of the processes that take place over time several years on an ongoing basis and requires attention to strength and the unique leader context [3]. Leadership skills look to the ability of a person to become a leader in whatever situation and theirs can control the situation wisely [4]. Besides, skills leadership plays a significant role in the event of anxiety and on time. That is all the skills, such as communication and management, will play a role.

Leadership Skill
Communication skills, inspiration and cognitive skills were performance management and leadership. It shows that the senior manager it is necessary to have better oral communication skills and less roar when communication goes on. The proactive responsibility of the leader more experienced need to be mobilised by taking time to introduce inclusive leadership development [5]. Some of the right manager lack of concern about public management, interpersonal, and non-verbal worries. Executive coaching is a combination of organisational development and leadership. Operational training is conducted through learning method through experience because leaders need to reach the target and report on success; It provides a way for leaders to understand its learning priorities and adapt to various behaviours Leadership includes building relationships with followers, peers, and stakeholders [6]. Executive guidance important part for teaching them about conversation skills and provide them with variety the aspect of managing others [7] and this is a significant benefit coaching through fast learning for leadership development for leaders who are behind science education.

The University of Kent has conducted a study on leadership guided. The findings show that different individuals also need to style a different direction. You may be able to manage a talented team member, efficient and reliable by using transformation techniques, whereas a lazy and unreliable person may need a style autocratic. Leadership skills and skills required in making an assessment and further action. The concept of mutual respect should be practised in engineering to make engineers more humane for carrying out their responsibilities as leaders in their careers. Research from Australia and European universities found educators reported lack of engineering leadership progress program if
compared to the American engineering faculty in the United States [8] organising programs in the formation of led leadership.

One study requires respondents to answer the question of the type of skills that can develop the most effective leadership qualities among students universities involve listening, speaking, reading and writing skills. The study found that out of 100 respondents, 59 agreed that skill communication could develop the most effective leadership qualities, 72 respondents agree leadership is a natural quality. But there is which denies that it can polish through training and other practices. The analysis found to develop leadership qualities, communication and education are the most important. It is one of the most effective communication skills and can create a variety of competent leadership skills [9].

Many authors in their studies presented in Professional Writing Seminar for Engineering expresses empathy as the primary skill for effective leadership and management. Managers and leaders practising empathy skills can communicate honestly and proactively even they have excellent listening skills. It makes the process achieving success to navigate their organisation easier, including while handling the uncertain transition times.

Confident leaders' behaviour in this leadership practice includes building trusting relationships with followers, listening and responding actively against various views, support the decisions made by followers, and give followers the opportunity as a leader [10,11,12]. The Leadership Practice Inventory has proven the authenticity of the group in the field of nursing leadership, teaching, education, and law enforcement has a high level of leadership though there has been a significant change in the environment over the last decade [13]. Research in leadership development has found in the fields of nursing education, education and psychology, and the development of female leadership [14,15].

Leadership is a practice of development for managers, especially in an organisations team structure [16]. Guidance for leadership development contributes to value financial business [17]. Leadership theory was more interesting than doctoral writing research [18]. Progress in the application of learning and improving the curriculum combines the way to learn leadership to accelerate leadership development [19]. Engineering students record the lowest score in practice leadership at the beginning of the year of study compared to students in the field of art, business and education. But they showed the highest increase in five leadership practices by the end of the year of study [20]. It is the hope of engineering firm, technology employer, faculty engineering at universities, licensing agencies, engineering unions and societies Science, Technology, Engineering and Mathematics (STEM) [4] in ensuring that the resulting Mechanical Engineers are competitive and ready with various possibilities to lead any governmental organisation later.

2. Materials and methods

By using the Discriminant Analysis method, the processing data involved, 300 respondents from the industry consist of management and administration groups, senior engineers, senior technologist and engineers. Items of the issues show the extent to which the requirements for Leadership Skills element according to current industry needs. Through this sum then comes the reading percentage and mean for Leadership Skills element with values in the table.

The seven elements contained in the model but only the aspects of leadership skills are using as a study element. The soft skills model introduced by the Malaysian of Education (MoE) was used throughout the study emphasis placed on aspects of leadership skills that centred on the mechanical engineers' workforce. The model shows in figure 1.
Modern engineering graduates need to be proficient in every aspect of the soft and generic skills if they want to succeed doing work at the workplace [21] to the best possible. This soft skill is essential to help to enhance the capabilities of a company [22], and this has proven by a study among students and faculty members of the engineering that, soft skills are especially crucial for engineering students with the added value of mastery English [23].

3. Results and discussions
The number of respondents involved in the process of answering this question item is 300 respondents. Among the questions items included are as follows (L1) Knowledge of essential theoretical leadership, (L2) Ability to lead the project, (L3) Ability to understand and take other roles between team captains and team members and (L4) Ability to oversee team members. Figure 2 shows the Box plot mean Soft Skills for elements (Leadership).

![Figure 2. Box plot mean (Leadership)](image)

Table 1 shows the leadership statistics formula. The table shows detailed information on mean readings that have produced in the study. Clearly shows the highest mean of the question item (L4), followed by (L2), (L3) and (L1).

| Question Item | Respondent | Minimum | Maximum | Mean Item |
|---------------|------------|---------|---------|-----------|
| L1            | 300        | 3.00    | 5.00    | 4.22      |
| L2            | 300        | 3.00    | 5.00    | 4.35      |
| L3            | 300        | 3.00    | 5.00    | 4.30      |
| 4. L4         | 5. 300     | 6. 3.00 | 7. 5.00 | 8. 4.36   |
Table 2, 3, 4 and 5 show the descriptive statistics of items questions for (L1), (L2), (L3) and (L4). Table 2 shows the five levels of requirements studied involving items questions (Knowledge of essential theoretical leadership).

**Table 2. Descriptive statistics of question items (L1)**

| Item | Level of Needs   | Frequency | Percentage |
|------|------------------|-----------|------------|
| 1    | very unnecessary | 0         | 0          |
| 2    | no need          | 0         | 0          |
| 3    | simple need      | 53        | 17.67      |
| 4    | need             | 128       | 42.67      |
| 5    | very necessary   | 119       | 39.67      |

Table 3 shows the five levels of requirements studied involving items questions (Ability to lead the project).

**Table 3. Descriptive statistics of question items (L2)**

| Item | Level of Needs   | Frequency | Percentage |
|------|------------------|-----------|------------|
| 1    | very unnecessary | 0         | 0          |
| 2    | no need          | 9.0       | 0          |
| 3    | simple need      | 25        | 8.33       |
| 4    | need             | 145       | 48.33      |
| 5    | very necessary   | 130       | 43.33      |

Table 4 shows the five levels of requirements studied involving items questions (Ability to understand and take intermediate roles between the captain and team member).

**Table 4. Descriptive statistics of question items (L3)**

| Item | Level of Needs   | Frequency | Percentage |
|------|------------------|-----------|------------|
| 1    | very unnecessary | 0         | 0          |
| 2    | no need          | 0         | 0          |
| 3    | simple need      | 29        | 9.67       |
| 4    | need             | 152       | 50.67      |
| 5    | very necessary   | 119       | 39.67      |

Table 5 shows the five levels of requirements studied involving items questions (Ability to supervise team members).
Table 5. Descriptive statistics of question items (L4)

| Item | Level of Needs | Frequency | Percentage |
|------|----------------|-----------|------------|
| 1    | very unnecessary | 0         | 0          |
| 2    | no need         | 0         | 0          |
| 3    | simple need     | 31        | 10.33      |
| 4    | need            | 131       | 43.67      |
| 5    | very necessary  | 138       | 46.00      |

Figure 3 shows Scree plot question items (Leadership) on an overall involving four elements of the questions reviewed. Question items (L2) the highest percentage was 92%, followed by (L3) 90%, (L4) 90% and the lowest rate (L1) with a percentage reading of 82%. The four items of questions indicate a very high level of need.

Figure 3. Scree plot question items (Leadership)

Table 6 shows the overall formulation of Soft Skills (Leadership) produced through research. The reading of the percentage is at a very high level of need. A very high rate has given an overview of the requirements of the Leadership elements in producing Mechanical Engineers such as which is expected by all parties.

Table 6. Question item summary (Leadership)

| Item | Level of Needs | Value |
|------|----------------|-------|
| Percentage | very necessary | 88.50 |

The mean is at a high level and the overall percentage shown in the findings of the study conducted by the researcher at a very high standard for this Leadership Element. Explanation by [13], there exists Inventory Leadership Practice in a particular professional group over the last decade, although there are still significant changes in the environment. These shows this element has its interests and needs in the field of Mechanical Engineering in particular to produce Mechanical Engineers competitive. The rapid changes in the environment will not affect the interest in these leadership skills.

In evaluating based on these elements, the items used knowledge of the basic theory of leadership. There are many leadership theories which have been around for so long. However, the application in everyday work needs to be wise. The use of these theories depends on the situation and current problems encountered according to the efficiency of the Mechanical Engineer itself and careful
discretion. It is a necessary fundamental thing known and controlled. This finding supported by [3], leadership is a continuous process by giving attention to strength and the uniqueness of a command. Effective communication is also one the process of competent leadership as stated by [9], and It is great to hope for organisations and employers in the field Mechanical Engineering as indicated by [4] in its findings.

The ability to lead the project is also the item studied in this element. In line with what [4] has stated, the ability to drive is seen in the handling of any circumstances and wise to control the situation. Through a study conducted by [16], leadership is a developmental practice for managers to handle something projects either lead horizontally or vertically within an organisation. The wisdom of choosing this kind of leadership at the same time will bear fruit positive and encouraging. Plans are being made easier for completed under a leader of the authoritative Mechanical Engineer.

Researchers also look at the ability to understand and take alternating roles between a team captain and team member. The findings of this study parallel and supported by [7] states, the principle of coaching with providing training and guidance is the best guidance for applying the value of leadership in each. This exercise will be creating mutual trust and exchanging roles in a state of affairs, which requires someone to act to make a decision. Refer to [6], also in conformity with the outcome of the study, all the necessary members and leaders adapt to various forms of behaviour, including in building a good relationship with each other. Mechanical Engineers should be prepared for leadership and at the same time lower their power on under his command to decide if the current situation requires such action for the common good.

The last thing reviewed in this element involves the ability to supervising troop members. The experience will differentiate the skills of the supervisor. The findings show it is consistent with the statements made by [5] older leaders need to be more proactive in driving and introducing inclusive leadership development amongst those who led. Supervisors or leaders also need to provide opportunities people led to expressing opinions as stated by [10,12] include maintaining good relations with each other, and this is consistent with the findings of the study conducted by the researcher. A mechanical engineer should be able to be a good supervisor and be fair to all workers under supervision. The way supervisors will manifest through pattern leadership, which is practised by a Mechanical Engineer itself and manner how the leadership qualities had been before.

4. Conclusions

Based on the elements of Leadership Skills, the researcher has concluded the following. Program in progress leadership should design as did engineering schools in America. They prioritise the concept of leadership in the effort to apply values of empathy in leadership and effective management. Study at the level the university also needs to make improvements in learning and curriculum by incorporating organised leadership learning. Leadership led will contribute to the financial value of an organisation and industry. Apart from providing services, one of the other features of a company or organisations needs to be a continuous element of revenue generation. It can realise through a sustainable leadership structure and expertise among experts which has entrusted.

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