IJBASS

*Volume I, Issue III, May 2013*

International Journal of Basic Applied & Social Sciences
*An Interdisciplinary, Peer Reviewed, Indexed Journal*
www.ijbass.caesjournals.org

# Leadership Capability Assessment of Senior Industrial Engineering Students

Jake M. Laguador[1], Michelle E. Velasquez[2], Kristoper C. Florendo[3]

*College of Engineering, Lyceum of the Philippines University, Batangas City, Philippines*

jakelaguador@yahoo.com[1], mich.che0025@gmail.com[2], kristoperflorendo@rocketmail.com[3]

***Abstract* – This study aimed to determine the leadership capability of the senior Industrial Engineering students. The descriptive survey type of research was utilized in the study. The respondents were the Senior BSIE students enrolled during School Year SY 2012-2013 at Lyceum of the Philippines University in Batangas City. The study found out that the students were certain that they can lead a team or group as perceived by themselves and their Research Adviser in terms of teamwork, communication and discipline. They have the capability to lead a team or a group effectively. They know how to manage people to achieve their goals. They have the ability to handle things when something went wrong. And they respect the opinion and idea of other people. It is also revealed that there is no significant difference between the perceptions of the research adviser and the students in terms of level of leadership capability of the BSIE 4 students. Making students realize their potentials will bring out their willingness to lead in every group activities and in their future jobs as well. Maintaining and implementing disciplinary measures in every class discussions and other subject requirements particularly in submissions and deadlines of projects together with appropriate sanctions in every offenses of students will be a great help for their leadership development.**

***Keywords* – Leadership Capability, Industrial Engineering Students, Lyceum of the Philippines, Teamwork, discipline.**

## I. INTRODUCTION

Leadership is a necessity. It must exist. In point of fact, there was no time in human society when men were leaderless. Psychologically or sociologically, Individuals or groups of individuals have to be led or they are doomed by the iron law of natural selection to extinction [1]. Leadership is a very important factor in societies. It is why the developed societies seek to educate political, social, scientific, cultural, art and ethical leaders by a regular plan and using universities and higher education institutes [2].

Leadership is a skill and learnable [3]. It is a process by which one person influences the thoughts, attitudes, and behaviours of others. It is also the ability to get people with different ways and thinking into one direction and goal. It is consists of qualities with high qualifications, ability to make fair judgements based on knowledge, information and experience, communication skills, the capacity to multitask and interpersonal skills. It is about building teams and communicating so that everyone works together. It is a key ingredient to successful businesses and championship teams. Teams that have this synergy tend to be the ones on top [4]. Leadership skills are very essential for successful management and also beneficial for a person's career in any field of their choice. A person

with such qualities can help the firm of the organization to achieve their goal and to bring fame to the company. It also enables an organization to maximize efficiency and to achieve organizational goals [5].

Industrial Engineering is a branch of engineering dealing with the optimization of complex processes or systems. It is concerned with the development, improvement, implementation and evaluation of integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis, as well as the mathematical, physical and social sciences together with the principles and methods of engineering design to specify, predict, and evaluate the results to be obtained from such systems or processes. Its underlying concepts overlap considerably with certain business-oriented disciplines such as operations management, but the engineering side tends to emphasize extensive mathematical proficiency and usage of quantitative methods.

Having the vision of "being a recognized university in the Asia Pacific Region", Lyceum of the Philippines University through College of Engineering obtained and formulated the most comprehensive programs for Industrial Engineering program to produce Industrial Engineers who will become leaders in exhibiting competent, committed, credible, and collaborative quality performance and skills for globally innovated industries and business.

This study aimed to determine leadership capability of the Industrial Engineering students and to assess possible effects of their leadership attitude towards the course. Revealing their outmost interest in leadership, particularly in achieving various skills in Industrial discipline, and utilizing gathered data for analytical purposes are the significance of this study. This study is intended to determine the leadership capability of Senior BS Industrial Engineering students of Lyceum of the Philippines University – Batangas during 1st Semester, SY 2012-2013.

The study also documented and analyzed the capability of the students in leading a group in an activity which shows teamwork, expressing ideas and opinions with their communication skills and taking up responsibility in their actions through discipline. Through this study, Industrial Engineering students will have a background of enhancing their skills even other students to become familiar about the skills that one has to develop. This will also serve as basis for advisers and faculty members who will handle the same students. They can help in enhancing and developing leadership capability of these students by providing and conducting different activities and by sharing their knowledge with their students. According to reference [6], student leadership development is the process of involving students in meaningful ways both in and beyond the classroom and providing opportunities for students to demonstrate their talents, skills, and interests while continuing to develop new skills. It is also about giving students more ownership of the programs they attend.

## II. OBJECTIVES OF THE STUDY

This study primarily aimed to determine the leadership capability of Senior Year Industrial Engineering students who were enrolled during the 1st Semester SY 2012-2013.

Specifically, this study was guided by the following objectives:

1. To determine the leadership capability of the Fourth year BS Industrial Engineering students as perceived by themselves and their Research Adviser in terms of:
    - 1.1 Teamwork;
    - 1.2 Communication; and
    - 1.3 Discipline.
2. To determine if there is a significant difference between the perceptions of the research adviser and the students in terms of level of leadership capability of the Senior Industrial Engineering students.
3. To propose an action plan that will enhance the leadership capability of the students and their academic performance in Statistics.

## III. HYPOTHESIS

This study hypothesized that there is no significant difference between leadership capability of the Fourth year BS Industrial Engineering students as perceived by themselves and their Research Adviser in terms of teamwork, communication and discipline.

## IV. MATERIALS AND METHODS

The descriptive type under quantitative method of research was utilized in the study. Quantitative Research is characterized by the use of statistical analysis with the objectives of describing, comparing and attributing causality. Each of these objectives is done through the assignment of numerical values to variables and the mathematical analysis of those values [7]. The respondents of the study were the total population of 22 Senior BS Industrial Engineering students who were enrolled during 1st Semester SY 2012-2013 and One (1) research adviser at Lyceum of the Philippines University in Batangas City.

Data were collected using a researcher-made questionnaire to analyze the leadership capability of the Fourth year BS Industrial Engineering students as perceived by themselves and their Research Adviser. The instrument was validated using test-retest method wherein the researchers asked the 10 engineering students who are not included as actual respondents to validate the instrument. After one week, the same respondents were asked again to answer the same set of questionnaire and the Cronbach's Alpha of .79 was obtained in the reliability test which falls within the rule of thumb of "good".

Data were gathered during the third week of September and the results were recorded using the scale in leadership capability used by the researcher in the study. The researchers administered the questionnaire personally to the 22 Senior Industrial Engineering students and 100% retrieval rating was achieved.

### *A. Data Analysis*

Weighted mean, rank and t-test were the statistical tools utilized in the study. The five-point Likert scale was used to interpret the result of the leadership capability of the Industrial Engineering students.

| Weight | Range | Verbal Interpretation (VI) |
|---|---|---|
| 5 | 4.50 – 5.00 | Excellent (E) |
| 4 | 3.50 – 4.49 | Very Satisfactory (VS) |
| 3 | 2.50 – 3.49 | Satisfactory (S) |
| 2 | 1.50 – 2.49 | Fair (F) |
| 1 | 1.00 – 1.49 | Poor (P) |

## V. RESULTS AND DISCUSSION

Table 1 presents the leadership capability of Fourth year Industrial Engineering students as perceived by themselves and their Research Adviser in terms of teamwork.

**Table 1**
**Leadership Capability of Fourth Year Industrial Engineering Students as Perceived by Themselves and their Research Adviser In Terms of Teamwork**

| **Teamwork** | **Research Adviser** | | **Students** | | **Total** | | |
|---|---|---|---|---|---|---|---|
| | **WM** | **VI** | **WM** | **VI** | **WM** | **VI** | **Rank** |
| 1. I work well as a member of a small group or team, | 3.05 | S | 4.00 | VS | 3.53 | VS | 4 |
| 2. I accept and follow instructions given by someone else. | 3.55 | VS | 4.14 | VS | 3.85 | VS | 1 |
| 3. I set goals for what the team wants to achieve. | 2.95 | S | 4.23 | VS | 3.59 | VS | 3 |
| 4. I work as a volunteer in the university to finish a task. | 1.95 | F | 3.43 | S | 2.69 | S | 5 |
| 5. I do not blame the team when something went wrong. | 3.59 | VS | 3.86 | VS | 3.73 | VS | 2 |
| **Composite Mean** | **3.02** | **S** | **3.93** | **VS** | **3.48** | **S** | |

Looking at the table it shows that as perceived by themselves and their Research Adviser in terms of teamwork majority of the Fourth year BS Industrial Engineering students agreed that they were accepting and following instructions given by someone else (WM = 3.85) and they do not blaming the team when something went wrong (WM = 3.59).This indicates that the students show respect and value the opinion and idea of each member of the team. And they know how to handle things when something went wrong. They also believed that they setting goals very satisfactorily for what the team wants to achieve (WM = 3.59) and they working well as a member of a small

group or team (WM = 3.53). Working as a volunteer in the university to finish a task (WM = 2.69) is the lowest among the indicators at rank number 5.While this signifies that the students have lack of initiative in working as volunteer or finishing a task inside the university is not their priority. It is also shown that the perception when it comes to leadership capability of Fourth year Industrial Engineering students in terms of teamwork of the students (WM = 3.93) is greater than their Research Adviser (WM = 3.02). This means that the students were confident with their leadership capability. While the composite mean is 3.48.

Table 2 presents the leadership capability of Fourth year Industrial Engineering students as perceived by themselves and their Research Adviser in terms of communication.

Most of them agreed that they were respecting the opinion of others (WM = 4.16) and giving their full attention to others when they were talking to them (WM = 4.03). This proves that the students act with proper behaviour when they were communicating with other people. They were also confident that they were giving clear instructions (WM = 3.73) and speaking well to the members of the group (WM = 3.57).

Dealing with conflicts and differences appropriately (WM = 3.34) is the least among the situations which shows the leadership capability of the students in terms of communications. This denotes that the students have the need to improve their skills on how to deal with the individual differences of the people in different situations.

**Table 2**
**Leadership Capability of Fourth Year Industrial Engineering Students as Perceived by Themselves and their Research Adviser In Terms of Communication**

| | **Communication** | **Research Adviser** | | **Students** | | **Total** | | |
|---|---|---|---|---|---|---|---|---|
| | | **WM** | **VI** | **WM** | **VI** | **WM** | **VI** | **Rank** |
| 1. | I speak well to the members of the group | 3.41 | S | 3.73 | VS | 3.57 | VS | 4 |
| 2. | I give my full attention to others when they talk to me. | 3.82 | VS | 4.23 | VS | 4.03 | VS | 2 |
| 3. | I respect the opinion of others | 3.82 | VS | 4.50 | E | 4.16 | VS | 1 |
| 4. | I deal with conflicts and differences appropriately. | 2.77 | S | 3.91 | VS | 3.34 | S | 5 |
| 5. | I give clear instructions to the group | 3.50 | VS | 3.95 | VS | 3.73 | VS | 3 |
| | **Composite Mean** | **3.46** | **S** | **4.06** | **VS** | **3.76** | **VS** | |

The composite mean is 3.76. And as perceived by the students of their leadership capability in terms of communicating with other people (WM = 4.06), it is greater than those of the Research Adviser (WM = 3.46). This also implies that the Research Adviser believes that his students must improve their communication skills to express themselves and be easily understood when leading a team or a group.

Table 3 presents the leadership capability of Fourth year Industrial Engineering students as perceived by themselves and their Research Adviser in terms of communication.

**Table 3**
**Leadership Capability of Fourth Year Industrial Engineering Students as Perceived by Themselves and their Research Adviser In Terms of Discipline**

| | **Discipline** | **Research Adviser** | | **Student** | | **Total** | | |
|---|---|---|---|---|---|---|---|---|
| | | **WM** | **VI** | **WM** | **VI** | **WM** | **VI** | **Rank** |
| 1. | I follow the policies, rules and regulations of the university. | 3.50 | VS | 4.05 | VS | 3.78 | VS | 2 |
| 2. | I act as a role model to my co-students. | 2.77 | S | 3.68 | VS | 3.23 | S | 5 |
| 3. | I demonstrate proper behaviour all the times. | 3.32 | S | 3.64 | VS | 3.48 | S | 3 |
| 4. | I apply the core values of the university. | 3.23 | S | 3.64 | VS | 3.44 | S | 4 |
| 5. | I keep my temper under control. | 4.32 | VS | 4.00 | VS | 4.16 | VS | 1 |
| | **Composite Mean** | **3.43** | **S** | **3.80** | **VS** | **3.62** | **VS** | |

Majority of the students believed that they were keeping temper under control (WM = 4.16) at rank number 1. They know how to manage their anxiety and annoyance in a situation. They also agreed that they were following the policies, rules and regulations of the university (WM = 3.78) and they were demonstrating proper behaviour all the times (WM = 3.48). Among the indicators given, applying the core values of the university (WM = 3.44) and acting as a role model to their co-students (WM = 3.23) are the lowest. This signifies that students have lack of sense of discipline in terms of following the core values of the university and they may be influenced by other people.

The composite mean is 3.62. As shown in the table, the Research Adviser has lower perception (WM = 3.43) than the students (WM = 3.80). The students believed that they were well disciplined enough to lead a team or a group. The significant difference between the perceptions of the research adviser and the students in terms of level of leadership capability of the BSIE 4 students in terms of teamwork, communication and discipline is revealed in Table 4.

As seen from the result above, the table provides the t-value of the leadership capability of Fourth year Industrial Engineering in terms of teamwork, communication and discipline, 0.0070, 0.0075 and 0.0768 respectively which are less than the critical value of 1.321 at 0.1 level of significance. The computed t-values indicate that there is no significant difference among the indicators of the study; therefore the null hypotheses provided are accepted.

**Table 4**
**Significant Difference between the Perceptions of the Research Adviser and the Students in Terms of Level of Leadership Capability of the BSIE 4 Students in Terms of Teamwork, Communication and Discipline**

| | Weighted Mean | T-value | Remarks | Decision |
|---|---|---|---|---|
| Teamwork | 3.48 | 0.0070 | Non-significant | Accepted |
| Communication | 3.76 | 0.0075 | Non-significant | Accepted |
| Discipline | 3.62 | 0.0768 | Non-significant | Accepted |

It can be noted that as perceived by the students and their Research Adviser, BSIE 4 have the capability to lead a team or a group effectively. They know how to manage themselves when it comes to getting other people with different ways and thinking into one direction and goal. They have initiative every time needed by being hands-on to every situation and by taking part in the solution and not the problem for the team. And especially is that they know how to respect the differences happening on their team.In addition, the students prove that they have the communication skills that must be observed on the leader of the team. They can also express themselves in front of a group with confidence. And they take responsibility in their actions.

The Table 5 shows the proposed action plan to enhance the leadership capability of Senior Industrial Engineering Students of Lyceum of the Philippines University – Batangas City.

## VI. CONCLUSIONS AND RECOMMENDATIONS

The Fourth year BS Industrial Engineering students were confident in leading a team or group as perceived by themselves and their Research Adviser in terms of teamwork, communication and discipline. Students' perception in their leadership capability does not differ with their Research Adviser's perception.

Giving students frequent reporting activities that will be presented in class orally, will enhance their communication skills and eliminate fears in expressing ideas, which is a mere factor of leadership capability. Making students realize their potentialities will bring out their willingness to lead in every group activities and in their future jobs as well. Maintaining and implementing disciplinary measures in every class discussions and other subject requirements particularly in submissions and deadlines of projects together with appropriate sanctions in every offenses of students will be a great help for their leadership development. Students must be given more projects and activities at home and in school which will be performed in collaborative manner to enhance their capability to lead and academic performance in different subjects and discipline that will be incurred by the course. Guiding them well and lot of patience and understanding must be given to these group of students because of their levels of leadership ability that need to be nourished to survive in more complex challenges of engineering.

Supplemental and comprehensive study may be conducted to analyze the leadership capability of Industrial Engineering students if they still have the same ability in terms of communication, teamwork and discipline which are the factors limiting their competency and capacity to lead, during their next year level of the course.

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