

Pearson BTEC Levels 4 Higher Nationals in Engineering (RQF)

Engineering Management

Unit Workbook 1

in a series of 1 for this unit

Learning Outcome LO1 to LO4

Engineering Management

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2 INTRODUCTION

This Workbook guides you through the learning outcomes related to:

LO1. Examine the application of management techniques, and cultural and leadership aspects to engineering organisations

Main concepts and theories of management and leadership:

Influence on organisational culture and communication practices.

Effect of change within an organisation on its culture and behaviour.

Management and leadership theories:

Management and leadership theories.

Managerial behaviour and effectiveness.

Organisational culture and change.

Organisational communication practices.

LO2. Explore the role of risk and quality management in improving performance in engineering organisations

Fundamentals of quality management:

Introduction to monitoring and controlling.

Most appropriate quality improvement methodologies and practices for different business areas, projects and processes in order to lower risk and improve processes.

Risk and quality management:

Risk management processes.

Risk mapping and risk matrix.

Quality management theories.

Continuous improvement practices.

Principles, tools and techniques of Total Quality Management (TQM).

LO3. Investigate the theories and tools of project and operations management when managing activities and optimising resource allocation

Operation management:

Main areas and stages of projects and operations management.

Most important methodologies focusing on eliminating waste and smoothing the process flows without scarifying quality

Project and operations management theories and tools:

Project appraisal and life cycle.

Logistics and supply chain management.

Operations management.

Resources management.

Sustainability.

Legal requirements governing employment, health, safety and environment.

LO4. Perform activities that improve current management strategies within an identified element of an engineering organisation

The key success of management strategies:

Following processes from end to end, from suppliers to customers.

Identifying areas critical for the success of a project or process.

Planning tools:

Gantt charts.

Flow charts.

Critical analysis and evaluation.

IMPORTANT NOTE:

It is recommended that in conjunction with this Workbook, that you also read “round your subject”. This means accessing and reading the references and other material given in this workbook as well undertaking your own research.

It is also recommended that you consult the following, which are related units:

Unit 4: Managing a Professional Engineering Project, and

Unit 35: Professional Engineering Management.

3 GUIDANCE

This document is prepared to break the unit material down into bite size chunks. You will see the learning outcomes above treated in their own sections. Therein you will encounter the following structures;

Purpose

Explains *why* you need to study the current section of material. Quite often learners are put off by material which does not initially seem to be relevant to a topic or profession. Once you understand the importance of new learning or theory you will embrace the concepts more readily.

Theory

Conveys new material to you in a straightforward fashion. To support the treatments in this section you are strongly advised to follow the given hyperlinks, which may be useful documents or applications on the web.

Example

The examples/worked examples are presented in a knowledge-building order. Make sure you follow them all through. If you are feeling confident then you might like to treat an example as a question, in which case cover it up and have a go yourself. Many of the examples given resemble assignment questions which will come your way, so follow them through diligently.

Question

Questions should not be avoided if you are determined to learn. Please do take the time to tackle each of the given questions, in the order in which they are presented. The order is important, as further knowledge and confidence is built upon previous knowledge and confidence. As an Online Learner it is important that the answers to questions are immediately available to you. Contact your Unit Tutor if you need help.

Challenge

You can really cement your new knowledge by undertaking the challenges. A challenge could be to download software and perform an exercise. An alternative challenge might involve a practical activity or other form of research.

Video

Videos on the web can be very useful supplements to your distance learning efforts. Wherever an online video(s) will help you then it will be hyperlinked at the appropriate point.

Definitions: Commonly used words

Explain: Make (an idea or situation) clear to someone by describing it in more detail or revealing relevant facts.

Identify: Indicate the main features or purpose of something by recognising it and/or being able to discern and understand facts or qualities.

Describe: Give a detailed account in words of.

Analyse: Examine (something) methodically and in detail, typically to explain and interpret it.

Critically Analyse: A critical analysis (sometimes called a critique, critical summary, or book review) is a systematic analysis of an idea, text, or piece of **literature** that discusses its **validity** and evaluates its worth.

Apply: Be applicable or relevant.

Explore: Skills and/or knowledge involving practical research or testing.

Determine: Ascertain or establish exactly by research or calculation.

Scope: The extent of the area or subject matter that something deals with or to which it is relevant.

See Moodle 'useful course resources' for an in-depth definition of words/terms or consult the Pearson BTEC Higher Nationals in Engineering Specification – Issue 5 - September 2017.

4 MAIN CONCEPTS AND THEORIES OF MANAGEMENT AND LEADERSHIP

4.1 Management and Leadership.

The words “leader” and “manager” are among the most commonly used words in business and are often used interchangeably. But they are far from the same thing.

A manager is the member of an organization with the responsibility of carrying out the four important functions of management: planning, organising, leading, and controlling.

Most managers also tend to be leaders, but only IF they also adequately carry out the leadership responsibilities of management, which include communication, motivation, providing inspiration and guidance, and encouraging employees to rise to a higher level of productivity.

Unfortunately, not all managers are leaders. Some managers have poor leadership qualities, and employees follow orders from their managers because they are obligated to do so—not necessarily because they are influenced or inspired by the leader.

Managerial duties are usually a formal part of a job description; subordinates follow as a result of the professional title or designation. A manager’s chief focus is to meet organisational goals and objectives; they typically do not take much else into consideration. Managers are held responsible for their actions, as well as for the actions of their subordinates. With the title comes the authority and the privilege to promote, hire, fire, discipline, or reward employees based on their performance and behaviour.

The primary difference between management and leadership is that leaders don’t necessarily hold or occupy a management position. Simply put, a leader doesn’t have to be an authority figure in the organisation; a leader can be anyone.

Unlike managers, leaders are followed because of their personality, behaviour, and beliefs. A leader personally invests in tasks and projects and demonstrates a high level of passion for work. Leaders take a great deal of interest in the success of their followers, enabling them to reach their goals to satisfaction—these are not necessarily organisational goals.

There isn’t always tangible or formal power that a leader possesses over his followers. Temporary power is awarded to a leader and can be conditional based on the ability of the leader to continually inspire and motivate their followers.

Subordinates of a manager are required to obey orders while following is optional when it comes to leadership. Leadership works on inspiration and trust among employees; those who do wish to follow their leader may stop at any time. Generally, leaders are people who challenge the status quo. Leadership is change-savvy, visionary, agile, creative, and adaptive.

4.2 Leadership Models.

This Workbook concentrates on the ten most popular contemporary leadership theories. However, it is sometimes useful to categorise them as follows;

Trait-Based	The oldest type of thinking about effective leadership. Logically, 'Trait-Based' leadership models focus on identifying the traits of successful leaders.
Behavioural Ideals	'Behavioural Ideals' leadership models concentrate on what researchers believe are the most effective behaviours as a leader. The notable model in this category is <u>Blake and Mouton's Managerial Grid</u> .
Situational/	'Situational' (or 'Contingency') leadership models are based on the idea that the leader's actions should vary according to the circumstances he or she is facing - in other words leadership methods change according to the 'situation' in which the leader is leading. This category includes most notably: <u>Kurt Lewin's Three Styles model</u> ; <u>Tannenbaum and Schmidt's Leadership Continuum model</u> ; the <u>Fiedler Contingency model</u> ; <u>House's Path-Goal theory</u> ; <u>Hersey and Blanchard's Situational Leadership® model</u> ; and <u>Bolman and Deal's Four-Frame model</u> .
Contingency	Functional types of leadership models focus on what the leader has to do. Unlike the Behavioural Ideals approach, Functional leadership models do not suggest ideal ways of behaving, nor do they match behaviours to circumstances like Situational/Contingency theory. Instead, Functional leadership models focus on the action areas that a leader must address to be effective. The most notable Functional models are <u>John Adair's Action-Centred Leadership</u> , and <u>Kouzes & Posner's Five Leadership Practices</u> .
Functional	The Integrated Psychological leadership model is so called because it integrates the thinking behind the four-other leadership model's sub-groups, while also addressing the leader's inner psychology, which tends not to be considered in other more traditional or conventional types of leadership models. <u>James Scouller's Three Levels of Leadership model</u> arguably pioneers this category. Scouller's model can be regarded as a relatively new view of leadership.

4.3 Ten Leadership Theories

One of the great challenges when it comes to proper leadership is balancing the various interests of those who you are required to lead. Not everyone is going to have the same goals and aspirations, even within the same business or organisation.

Therefore, it is the job of a good leader to reconcile all of those various interests and bring them together in a way that keeps the team working in the right direction. With good leadership, it is possible to bring everyone together in a common pursuit even if they have divergent goals among themselves.

4.3.1 Action Centred Leadership (ACL)

ACL is notable because it can help reconcile the various goals and desires of individuals while still accomplishing the specific goals set out for the team and the project as a whole.



Figure 4:1 Action Centred Leadership

At its simplest form, the model can be described by how it divides leadership into the areas of 'Task', 'Team' and 'Individual'. Each element plays an important role in the leadership picture, and only when all three are balanced properly will the leader be achieving success.

Harmony among the three might not always be the easiest goal to reach, but it is the job of the leader to make it happen. Looking at each element in turn you can understand how each of these three aspects is important. (See Figure 4:1)

4.3.1.1 *It All Starts with a Task*

Without a task, there is no reason to have a team made up of individuals, and no reason to lead them in the first place. No matter what the goal is, that task is what will guide the leadership that has to be provided to the team.

One of the most important jobs of the leader is to actually define and identify the task at hand. Sometimes this will be quite easy, but other times it can actually be a serious challenge. Teams work together better when they are clear on the task at hand, so providing that definition in no uncertain terms is a major part of the equation.

Among the other important parts of the task, including identifying milestones that need to be met, is establishing who is responsible for which part of the task, and what will be defined as success in the end. Monitoring progress and making sure that the group is getting closer and closer to accomplishing the task falls on the leader and is an important part of the Action Centred Leadership model.

4.3.1.2 *Teamwork is Essential*

Leading the team is what most people think of traditionally as being 'leadership'. Any given team is made up of individuals with various skills and experiences, so it is up to the leader to extract the best possible performance from each of them. The leader should define how the team works together, such as communication standards and methods for resolving conflict.

Encouragement is another important part of the Action Centred Leadership plan, especially for long projects. The members of the team need to remain focused on the 'prize' at the end of the task, so they can remain motivated and determined to reach a successful conclusion to the project. Making sure that the

team as a whole feel invested in the success of the group is something that a good leader will be able to accomplish.

4.3.1.3 Don't Forget About the Individuals

Forgetting about individuals within the team is probably the most common leadership mistake that is made by managers in all areas of business. Extracting the best from each person on the team means treating them as the individual that they are. Offering rewards or praise for a strong contribution to the team is a common tact for getting the best possible performance from members of the team. Only when the leader is able to place each person in the role that is best suited for them will the team be able to function as successfully as possible.

Action Centred Leadership is a popular leadership model to follow in large part because of the simplicity that it offers. Task, Team, and Individual

Key Points
<ul style="list-style-type: none"> • Action Centred Leadership involves balancing task, team and individual focus. • Each of these three elements plays an important role in the leadership picture, and only when all three are balanced properly will the leader be achieving success. • No matter what the goal is, that task is what will guide the leadership that has to be provided to the team. • Making sure that the team as a whole feel invested in the success of the group is something that a good leader will be able to accomplish. • Only when the leader is able to place each person in the role that is best suited for their skills and interests will the team be able to function as successfully as possible.

Table 4:1 ACL Key Points

4.3.2 Blake-Mouton Managerial Grid

The Blake-Mouton Managerial Grid is a system that can be used to group like leaders into categories based on the methods that they use.

While no organisational system will ever be perfectly complete, this grid is a great way to understand more about certain leadership styles and how they work. Dating back to the early 1960's, this is a framework that has stood the test of time and remains relevant today.

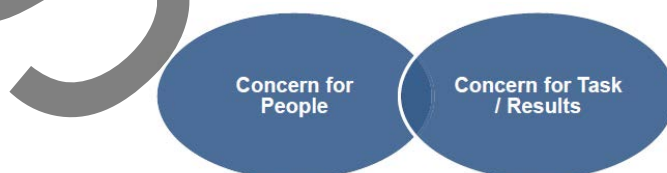


Figure 4:2 Blake-Mouton Managerial Grid

The two dimensions of this grid quickly identify the priorities of the manager in question - 'Concern for People' and 'Concern for Results' – and it doesn't get much simpler than that!