AEERO
SUPPORTING INFORMATION
BUSINESS IMPROVEMENT
TECHNIQUES

INTRODUCTION TO THIS GUIDE

This guide provides supporting information that can be used as either taught or self-guided learning materials to better understand the context of the AEERO PMAPP App and how it fits within the wider contexts of Business Improvement Techniques and Quality Management Systems governed by International Quality Standards.

It explains the concept of Business Improvement Techniques, introducing some of the main methodologies and their role within a culture of continuous improvement.

It also outlines the key principles of the Lean production model, expanding in more detail on the visual lean tool of process mapping which the AEERO project has developed into the AEERO PMAPP App.

The link between International Quality Standards and how the AEERO PMAPP App can be used as an effective tool for complying with these standards is also detailed and information given on the way the app and supporting materials may fit within the technical framework of ECVET.

AEERO AND BUSINESS IMPROVEMENT TECHNIQUES

Business Improvement Techniques (sometimes also known as Process Improvement Techniques) is an all-encompassing term for various techniques and theoretical approaches that each have the goal of attaining process improvement through increasing efficiency. These methodologies include: continuous improvement, reengineering, Hoshin Kari, Total Quality Management (TQM), Kaizen, Lean, Six Sigma etc. and include tools that can be used to innovate and improve service delivery through creating better process flows, increasing quality, creating capacity and eliminating waste. The AEERO project concentrated on adapting one of these tools – process mapping, into a free, app-based learning tool.

Business Improvement Techniques are centred on proven tools and methodologies of lean process and quality improvement activities designed to support continuous improvement by providing effective team working and developing lean skills. They can be used to ensure that business practices

are planned and executed as efficiently as possible, teach learners how to identify and eliminate waste, create flow and improve quality, leading to greater efficiency and increased profitability whilst ensuring that the highest quality standards are met.

The teaching of Business Improvement Techniques in Vocational Education and Training (VET) environments have the key learning objective of improving business performance through the delivery of Quality, Cost and Delivery (QCD) benefits. This is achieved by providing learners with all the skills needed to effectively monitor and make improvements to production and manufacturing processes. Key learning topics can include continuous improvement, workplace organisation, visual management and problem-solving techniques.

AEERO AND CONTINUOUS IMPROVEMENT

The overarching concept of Continuous Improvement (also known as Kaizen due to its roots in the Japanese manufacturing industry) is the idea of a business employing ongoing effort to improve products, services or processes. This can be incremental improvement (over time) or breakthrough improvement (all at once).

Continuous improvement may drive increased effectiveness for the customer or client and increased efficiency for the business enabling them to be competitive within both home and global markets. The concept recognises that customers are demanding more and better from their suppliers and has generated methods and tools that can help organisations to improve by reducing costs and prices, reducing delivery and lead times, improving quality, improving health and safety, improving customer service and satisfaction levels, improving inventory control and ensuring the manufacture or production of minimum quantities only.

It is important to note that successfully achieving sustained quality improvement requires commitment from the entire organisation, particularly from top level management.

AEERO AND LEAN PRODUCTION

The Lean model for production and manufacturing is a collection of business practices, strategies and methods that focus on waste elimination and continuous improvement within an organisation. It is applicable to a range of business sectors.

It comprises a core doctrine of six guiding principles to outline the ways in which an organisation can produce an environment and culture centred on waste reduction, efficient business methods and continuous improvement:

- Continual elimination of waste
- Goals with a broad view
- Simplicity
- Continuous improvement
- Organisational visibility
- Flexibility

Elimination of waste is essential to this philosophy, and it identifies 3 categories of manufacturing waste that collectively describe the types of wasteful practices, the 3 M's: Muda, Mura and Muri.

- MUDA – waste caused by any activity that consumes resources without creating value for the customer.
- MURA – waste caused by unevenness in an operation.
- MURI – waste created through overburdening (either of equipment or operations).

Muda can be further broken down into the '8 Wastes' which are eight types of process obstacles that get in the way of providing value to the customer. These are listed below along with an example of each waste which may arise in a typical workplace.

- OVERPRODUCTION – producing unnecessary paperwork
- PEOPLE – underutilisation of people's talent skills and knowledge
- TRANSPORTATION – multiple email circulation lists, departments who need to work together being separated geographically
- INVENTORY – excessive stationery supplies, fleet cars not in use
- MOTION – needing to move equipment between locations, unnecessary motion by people e.g. walking, bending, stretching
- IDLE TIME – waiting for IT support or for information from other people needed to progress with a task
- SCRAP/REWORK – incorrect documentation
- EXCESS PROCESSING – too much (repeated or duplicated) information that isn't required, unnecessary levels of authorisation

As an extensive waste reduction and production improvement system, the LEAN method has an array of theories and tools that can be drawn upon by decision makers to enhance the business operations of their organisations, for example, process flow analysis and process mapping which were the key focus of the AEERO project and are discussed in more detail below.

AEERO AND PROCESS FLOW ANALYSIS
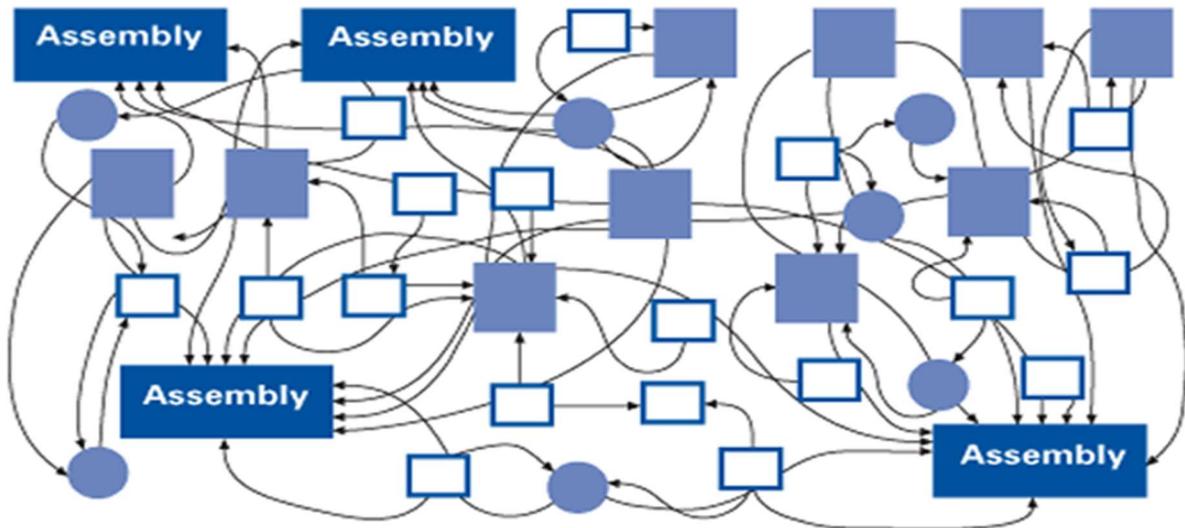
Process Flow Analysis is a visual lean tool used to pictorially show waste within a process. It is used to identify waste and opportunities for improvement and can also be used measure the process efficiency. It uses collected data to quickly identify process waste and excessive lead time. This data can be used to calculate percentages of value-adding, non-value-adding and wasted time spent throughout a given period, or within one complete process cycle.

- VALUE-ADDED ACTIVITY – any work that changes the nature, shape or characteristics of the product/service in line with customers' requirements.

  The percentage of time spent on this type of activity should be MAXIMISED.

- NON-VALUE-ADDED ACTIVITY – any work carried out which is necessary under current conditions but does not increase product/service value.

 The percentage of time spent on this type of activity should be MINIMISED.

- WASTE – all unnecessary work.

  The percentage of time spent on this activity should be ELIMINATED.

AEERO AND PROCESS MAPPING

The AEERO PMAPP App (see user guide for detailed information and instructions) allows users to simply map each stage of any process. Users can record time and distance for each element of a process while 'walking the floor'. Plotting time and distance allows performance measures to be made and efficiency percentages of any process calculated.

The AEERO PMAPP App allows the standard process flow analysis types of steps to be recorded based on standard process flow icons.
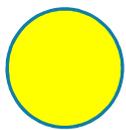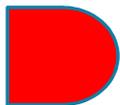
OPERATION - main steps of the task/job involving modification / change

(Maximise the % of time spent)

INSPECTION - checking quality/quantity

(Minimise the % of time)

TRANSPORT – for movement of the persons/quantity

(Reduce to improve lead time)

DELAY - for waiting time of the operators or materials

(Remove to create more operation time)

STORAGE – controlled storage involving authorised issue/receipt of materials etc.

(Reduce to improve lead time and stock turns)

The app provides results that summarises the following elements:

– Percentage efficiency of the entire process
– Total time taken to complete the process

- Total value-added time
- Total non-value-added time
- Total transport time
- Total delay time
- Total inspection time
- Total storage time

This highlights when, for example, parts are delayed or in storage for excessive amounts of time which could be due to factors such as equipment change over or poor stock control.

Collecting and analysing this data are key in order to reflect the current status and efficiency of any process. It also allows improvement gains resulting from changes made to improve the efficiency of any process to be objectively measured and compared against a baseline position.

This is particularly important when implementing a project to improve the efficiency of a process within a programme of continuous improvement. A project may be able to be described as having worked, but the only way to demonstrate that the outcome of the project justifies the effort and cost of implementation is through this type of measurement which can clearly quantify improvement gains.

The PMAPP App results effectively highlights areas and steps in a process where efficiency can be improved. It should provide the catalyst to improving the efficiency of your process by reducing time spent on non-value-added activity as part of a wider continuous improvement project.

AEERO AND INTERNATIONAL QUALITY STANDARDS

The International Organisation for Standardisation develops and publishes International Standards including the ISO 9000 family – the world's best-known quality management standard for companies and organisations of any size.

The ISO 9000 family addresses various aspects of quality management and the standards provide guidance and tools for companies and organisations who want to ensure that their products and services consistently meet customer's requirements and that quality is consistently improved.

ISO 9000:2015

This standard describes the fundamental concepts and principles of quality management which are universally applicable to:

- Organisations seeking sustained success through the implementation of a quality management system.
- Customers seeking confidence in an organisation's ability to consistently provide products and services conforming to their requirements.
- Organisations seeking confidence in their supply chain that their product and service requirements will be met.
- Organisations and interested parties seeking to improve communication through a common understanding of the vocabulary used in quality management.
- Organisations performing conformity assessments against the requirements of ISO 9001.
- Providers of training, assessment or advice in quality management.

ISO 9001:2015

This standard sets out the criteria for a quality management system and is the only standard in the family that can be certified to. It can be used by any organisation, large or small, regardless of its field or activity.

This standard is based on 7 quality management principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement.

Using ISO 9001:2015 helps ensure that customers get consistent, good quality products and services which in turn brings many business benefits.

These standards are based on seven quality management principles (QMPs):

- Customer focus
- Leadership
- Engagement of people
- Process approach
- Improvement
- Evidence based decision making
- Relationship management

Quality Management principles are a set of fundamental beliefs, norms, rules and values that are accepted as true and can be used as a basis for quality management.

The AEERO PMAPP App can be positively utilised particularly in respect of QMP4-Process Approach to help optimise performance through effective and efficient process management.

ISO has a range of standards for quality management systems that are based on ISO 9001 and adapted to specific sectors and industries.

AS 9100

This standard is based on ISO 9001 requirements and specifically modified for aerospace companies. The International Aerospace Quality Group (IAQG) took the ISO 9001:2015 requirements in their entirety and then added in specific aerospace Quality Management System requirements, creating the AS9100 Revision D standard.

The quality management system requirements emphasises the need to manage, control and audit your organisations processes and the AEERO PMAPP App has been specifically designed as a tool that businesses can use to adhere to this.

By using the PMAPP App to better understand an organisation's processes used to provide products and services as well as taking an aerial system view of how these processes interact; you can work to make each process better and also reduce inefficiency, thereby realising a key benefit of implementing AS9100 Rev D.

A process map is a simple way to provide a high-level view of the processes that make up a business management system and is a very effective tool for complying with ISO 9001.

AEERO AND ECVET

The AEERO project app and supporting resources may be used to support the delivery of relevant qualifications across the EU. One model is ECVET (The European Credit System for Vocational Education and Training).

ECVET is a technical framework which supports the transfer, recognition and accumulation of learning outcomes. ECVET provides a set of principles and tools that facilitate the process of learner recognition, with a view to achieving a qualification.

In ECVET, a series of tools and templates can be used in the delivery of geographical mobility programmes, supporting learners in getting the most out of their international experience and ensuring a better understanding of learning provisions and qualifications in other countries.

The use of learning outcomes creates a clear picture of what a learner will know and be able to do by the end of a course. ECVET provides templates to facilitate the learning mobility process, namely the Learning Agreement (LA) and the Memorandum of Understanding (MoU), which confirm the learning duration and expected learning outcomes as well as plans for credit transfer and accumulation.

The use of ECVET principles can lead to a more beneficial mobility experience for learners and a more valuable relationship between partner organisations.

ECVET for learners - Mobility programmes can become more attractive to learners with tangible outcomes that relate to an existing VET programme or qualification. Receiving formal recognition for the learning achievements acquired during a mobility abroad means that learners no longer have to repeat or catch-up missed elements of learning on return. Following the ECVET principles, quality assured and well-documented learning puts learners in a better position to present acquired skills to employers.

ECVET for VET institutions/practitioners - VET providers can develop more productive long-term partnerships with their partners oversees, facilitate increased learner participation and enhance programme design. Learning from their peers in other European countries, VET practitioners can enhance programme design, learning delivery and learning assessments. Through the use of learning outcomes, ECVET allows for improved design and enhanced quality assurance in the delivery of mobility programmes.

The ECVET website provides more detailed information for learners and providers, along with a range of supporting documents such as model agreements.

Further information is available at https://www.erasmusplus.org.uk/how-you-can-use-ecvet and http://www.ecvet-toolkit.eu/ .