Unit 42: Quality Management Systems in Logistics

Unit code: H/600/8606

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The unit provides learners with a comprehensive overview of the interrelating quality assurance systems used by leading logistics organisations. The maintenance and assurance of quality in organisations is crucial in helping them achieve a competitive edge.

Unit introduction

The aim of this unit is to provide learners with an insight into management, monitoring and quality assurance techniques used by organisations involved in logistics on a global stage.

The learner should develop knowledge and understanding of these techniques and systems that are used to strive for continuous improvement in this industry.

Specifically learners, through their knowledge of the elements of quality systems, will be able to learn how to produce an improvement plan through the acquired knowledge of continuous improvement techniques.

This unit also presents opportunities to demonstrate key skills in application of, communication, information and communication technology, improving own learning and performance, problem solving and working with others.

Learning outcomes

On completion of this unit a learner should:

1 Know continuous improvement techniques for logistics organisations

2 Be able to produce an improvement plan

3 Know elements of quality systems

4 Understand the techniques used in modern logistics.

Unit content

1 Know continuous improvement techniques for logistics organisations

Continuous improvement: techniques; need for continuous improvement systems for competitive advantage, overview of Schonberger's 17 points for world class manufacturing; approaches – overview of approaches to continuous improvement and quality; apply – industry-based case studies eg elimination of waste for competitive advantage

Theorists: Crosby (eg four absolutes, 14-point improvement plan, Deming eg statistical control); the PDCA cycle of systematic development (or Deming cycle) – plan, do, check, act; 14-point quality management plan; Juran eg breakthrough; customer-supplier chains; Shingo – zero defects (eg source inspection, immediate feedback, 100 per cent inspection, mistake proofing); Kaizen (eg incremental steps of continuous improvement); Kaizen goals – quality, cost, delivery; Kaizen foundations – 5S Seri organisation; Kaizen systems; total productive maintenance (TPM), just-in-time (JIT), visual factory, suggestion schemes, small group activities; Kaizen improvement cycle

2 Be able to produce an improvement plan

Tools of quality: tools of quality eg Pareto charts, histograms, bar charts, Gantt charts, process flow charts, statistical process control (SPC) charts, scatter diagrams, idea generation

Application: selection and application of appropriate quality tools for problem solving eg idea generation and improvement plan applicable to the logistics organisation

3 Know elements of quality systems

Definitions of quality: perception of quality; quality control; quality assurance; Total quality management (TQM); defect, defective, acceptable quality level

Key elements: quality standards – overview of ISO9000, ISO14000, BSI, CE

Systems: organisational – quality management, quality assurance, quality control systems; manuals eg quality policy, organisational description, definitions and symbols, corrective and preventative action, documentation, operational procedures; economics eg total cost of quality model, prevention costs, appraisal costs, failure costs

4 Understand the techniques used in modern logistics

Supply chain approaches: lean, agile, collaborative, make to order or make to stock

Supply chain: push systems eg MRP, MRPII – software for manufacturing; pull systems eg JIT, Toyota Production System; production management systems eg organisation for production; discrete production – job, batch, mass; continuous processing

Techniques: manufacturing eg TPM; single minute exchange of dies (SMED); production cell approach (U-shaped layout); procurement eg e-procurement; warehouse eg flow management, cross docking; transport eg merge in transit

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe the need for continuous improvement [CT1]		
P2 describe the approaches to continuous improvement and quality in logistics [CT2]	**M1** explain the approaches to continuous improvement and quality with reference to relevant theorists	**D1** analyse the approaches to continuous improvement and quality with reference to relevant theorists
P3 compare quality tools in terms of their suitability [IE4]		
P4 produce an improvement plan [IE1]	**M2** analyse an improvement plan by selecting and applying quality tools to a logistics problem	**D2** evaluate an improvement plan by selecting and applying quality tools to a logistics problem.
P5 describe the key elements of quality standards [CT6]		
P6 describe the organisation of quality systems [IE4]		
P7 explain the implementation of a modern approach to logistics. [CT5]	**M3** analyse the implementation of a modern logistics approach.	

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, site visits, supervised practical activities, research using the internet and/or library resources, and the use of personal and/or industrial experience, are all suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject.

Learners should be encouraged to read an appropriate range of documents and library/internet source material relating to the unit content. Overall delivery of the unit should be supported by the use of case studies and other industry-related documents.

The learning outcomes are linked and form a logical, consistent and progressive structure, starting with the approaches to quality and continuous improvement followed by quality tools, quality systems, quality standards and their application to a modern logistics businesses.

Teaching and learning strategies designed to support delivery of the learning outcomes should take an integrated learner-centred approach. This would involve learners carrying out extensive investigative work.

This unit should be based on both a classroom approach and learners investigating of the subject area in the context of the logistics industry. Learners may benefit from the theory being supported by a wide range of examples, comparing the logistics industry with other areas of business. Unit content may be linked to learners' experience in relation to procedures and practices of logistics operations.

Learners will benefit from visits to logistics outlets and visits from guest speakers directly involved in quality assurance across a range of establishments in the logistics industry. Visitors will provide an excellent, current industry perspective. Speakers from other industries may provide useful information so learners can see the similarities and differences in their approach.

A mix of learning materials should be used, including internet research, CD ROMs, specific study packs on lean logistics and supply chain topics, worksheets, industrial case studies, videos and books for extended study where appropriate.

Group activities are strongly recommended, but tutors will need to ensure that individual learners have equal experiential and assessment opportunities.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way of planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Tutor explanation: introduction to the unit.
Tutor explanation/class discussion: why is continuous improvement needed?
Tutor input: various approaches to continuous improvement.
Class exercise: group work on approaches followed by short presentations to the class – tutor to facilitate.
Tutor input: important theorists – I.
Tutor input: important theorists – II.
Tutor input: important theorists – III.
Class exercise: group work: learners to carry out research followed by group discussions – tutor to provide briefs and facilitate.
Guest speakers: from a logistics organisation and/or professional body – approaches to quality and continuous improvement.
Tutor explanation/class discussion: case studies.
Preparation for assignment. **Assignment 1: Continuous Improvement and Quality Circles approaches – covering P1, P2, M1 and D1**
Tutor explanation/class discussion: what are quality tools?
Tutor input: quality tools.
Class exercise: group work on 'tools' followed by short presentations to the class – tutor to facilitate.
Tutor input: selecting a tool.
Tutor input: preparing an improvement plan.
Learner activity – individual work: produce an improvement plan – mock exercise in preparation for the assignment. Learners to carry out the work and present before the class with justification – tutor to provide briefs and facilitate.
Tutor explanation/class discussion: feedback and case studies.
Preparation for assignment. **Assignment 2: Improvement Plan – covering P3, P4, M2 and D2**
Tutor explanation/class discussion: what is quality?
Tutor input: defining quality.
Class exercise: group work on quality approaches followed by short in-class presentations – tutor to facilitate.
Tutor input: quality standards.
Class exercise: group work: Learners to carry out research on a given quality standard followed by group discussions – tutor to provide briefs and facilitate.
Tutor input: modern logistics techniques – I.
Tutor input: modern logistics techniques – II.
Tutor input: modern logistics techniques – III.
Guest speakers: from a logistics organisation and/or professional body – modern logistics techniques.
Tutor explanation/class discussion: case studies.

Topic and suggested assignments/activities and/assessment
Preparation for assignment.
Assignment 3: Quality in Logistics – covering P5, P6, P7 and M3
Review of unit delivery and assessment.

Assessment

Formative assessments should be used throughout the unit, giving learners the opportunity to receive developmental and constructive guidance and feedback. This will allow them to gain an understanding of their personal achievement and the methods they can sue to develop their learning.

Formative assessment should consider diverse sources of evidence. These may come from activity-based projects, observation and questioning, peer/tutor/logistics organisation witness testimony or personal statements. Group or individual planning and implementation documents are also an invaluable source of evidence. Evidence of outcomes can be collected from case studies, assignments and projects, which should enable learners to demonstrate their knowledge and understanding of continuous improvement, quality tools, quality systems and modern manufacturing systems.

There are many suitable forms of assessment that could be used, and centres are encouraged to consider and adopt these where appropriate. Some examples are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the different forms of assessment evidence that would be acceptable.

Some criteria could be assessed directly by the tutor during practical activities. If this approach is used, suitable evidence from guided activities would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

Evidence for the learning outcomes can be achieved through well-planned assignments and projects. These will usually be carried out individually but it is possible to introduce elements of teamwork into the collection or collation of data or simulations of the planning process such as public consultation or inquiry. Where available, workplace evidence can be incorporated, provided that is appropriate and authenticated as the learner's own work. Integrative assignments will help to link this unit with other units in the programme. The volume of evidence required for each assessment should take into account the total number of assessments being contemplated and the design of the overall teaching programme.

The structure of the unit suggests that the grading criteria may be fully addressed by using three assignments. The first assessment would cover learning outcome 1 (P1, P2, M1 and D1), the second would cover learning outcome 2 (P3, P4, M2 and D2), and the third would cover the learning outcomes 3 and 4 (P5, P6, P7 and M3).

To achieve a pass grade learners must meet the seven pass criteria listed in the grading grid.

For P1, learners must be able to describe the need for continuous improvement. Learners should focus on gaining a competitive edge in the marketplace and should give an overview of the approaches used. Evidence for this criterion could be a report and/or presentation/oral questioning.

For P2, learners must be able to describe the approaches to continuous improvement and quality. Learners should demonstrate their understanding of the underpinning theories clearly. This can be set as an extension to P1. Suitable evidence approaches are the same as for P1.

For P3, learners must be able to compare quality tools in terms of their suitability. Learners should include at least five tools. Comparison should be carried out in a way that helps in choosing the suitable tool. Evidence for this criterion could be a report supported by examples.

For P4, learners must produce an improvement plan. This should be based on a tutor-provided brief or case study. Learners should demonstrate that they can apply the knowledge to a given situation. Examples of suitable evidence approaches are the same as for P1.

For P5, learners must be able to describe the key elements of quality standards. They should include one international and one BS/CE standard. Suitable evidence approaches are the same as for P1.

For P6, learners must be able to describe the organisation of quality systems. They should include control/management/assurance type systems, related documentation and cost factors. Suitable evidence approaches are the same as for P1.

For P7, learners must be able to explain the implementation of a modern logistics approach. Learners should include at least six approaches supported by examples. Suitable evidence approaches are the same as for P1.

To achieve a merit grade, learners must meet all of the pass grade criteria and the three merit grade criteria.

For M1, learners must explain the approaches to continuous improvement and quality with reference to at least four relevant theorists. Learners may rely on web-based sources. However, they should reference/acknowledge the sources of information. This can be set as an extension to P2. Suitable evidence approaches are the same as for P1.

For M2, learners must analyse an improvement plan by selecting and applying quality tools to a logistics problem. Learners should analyse their choices and proposals. This is an extension to P4 and is a good check on the quality of the plan. Suitable evidence approaches are the same as for P1.

For M3, learners must analyse the implementation of a modern logistics approach. This can be set as an extension to P7. Suitable evidence approaches are the same as for P1.

To achieve a distinction grade, learners must meet all of the pass and merit grade criteria and the two distinction grade criteria.

For D1, learners must be able to analyse the approaches to continuous improvement and quality with reference to relevant theorists. The brief provided should give learners opportunities to carry out this analysis. Learners should also include some real-world examples. This can be set as an extension to P1/M1. Suitable evidence approaches are the same as for P1.

For D2, learners must evaluate an improvement plan by selecting and applying quality tools to a logistics problem. The brief provided should give learners opportunities for learners to carry out this evaluation. Learners should also include some real world examples. This can be set as an extension to P4/M2. Suitable evidence approaches are the same as for P1.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1, D1	Continuous Improvement and Quality Circles Approaches	You have recently joined the Quality Assurance section of a national logistics organisation. Your manager has asked you to carry out research into the need for, and approaches to, continuous improvement and quality. This will be posted on the company intranet for all employees and hence copyright violations should be avoided by referencing and acknowledging the source(s) of information.	A portfolio/report containing a description of various approaches to quality and continuous improvement. For higher level achievement, an analysis of these approaches will be included with reference to theorists.
P3, P4, M2, D2	Improvement Plan	Your first report has been well received. Your manager has now asked you to produce an improvement plan for one of the sections as detailed in the attached case study.	A portfolio/report containing an improvement plan and a comparison of quality tools. For higher level achievement, an analysis and evaluation of the improvement plan justifying the choice of tools etc will be included.
P5, P6, P7, M3	Quality in Logistics	You have recently joined the Quality Assurance section of a national logistics organisation. Your manager has asked you to carry out research into quality standards, quality systems and the implementation of a modern logistics approach. This will be posted on the company intranet for all employees and hence copyright violations should be avoided by referencing and acknowledging the source(s) of information.	A portfolio/report containing a description of quality systems and standards as well as an explanation of a modern logistics approach. For higher level achievement, an analysis of the implementation of a modern logistics approach will be included.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

Achievement of the learning outcomes of this unit will contribute towards the skills, knowledge and understanding of several units of the National Occupational Standards for:

- Supply Chain Management
  - Unit M3: Propose improvements to the supply chain
  - Unit M4: Introduce improvements to the supply chain
- Traffic Office
  - TO2: Improve the customer relationship
  - TO12: Contribute to the development of teams and individuals
- Logistics Operations Management
  - Unit LOM9: Improve the quality of logistics operations.

Essential resources

Learners will benefit from a visit to the sourcing and buying departments of different organisations in the supply chain. This will enable them to understand that, although the procedures and processes using different organisations are rarely the same, the underlying aims and objectives do not vary. They should have access to the internet, for research purposes, and to up-to-date textbooks in order to keep abreast of any developments that may occur.

Health, safety and welfare issues must be considered at all times and risk assessments should be undertaken for all site visits used in the delivery or assessment of the unit. Access to suitable development sites may require permission from the owner, especially if learners need to visit the site for research.

Employer engagement and vocational contexts

The use of vocational contexts is essential in the delivery and assessment of this unit. Much of the work can be set in the context of case studies of local employers. Learning outcomes 2, 3 and 4 lend themselves to investigating industrial practices.

Indicative reading for learners

Textbooks

George M, Maxey J, Rowlands D and Upton M – *The Lean Six Sigma Pocket Toolbook: A Quick Reference Guide to 70 Tools for Improving Quality and Speed* (McGraw-Hill Professional, 2005) ISBN 9780071441193

Lai K and Cheng T – *Just-in-Time Logistics* (Gower, 2009) ISBN 9780566089008

Liker J – *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* (McGraw-Hill Professional, 2004) ISBN 9780071392310

Websites

www.berr.gov.uk	The Department for Business Innovation and Skills
www.bsi-global.com	British Standards Institution
www.efqm.com	European Foundation for Quality Management
www.quality-foundation.co.uk	British Quality Foundation

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	analysing their improvement plan by choosing a quality tool producing an improvement plan identifying questions to answer and problems to resolve evaluating the proposed plan
Self-managers	managing time and resources while producing an improvement plan
Creative thinkers	generating ideas and exploring possibilities whilst producing the plan asking questions regarding sourcing strategies.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Team workers	working on and presenting joint research outcomes
Reflective learners	appraising and improving their own work.

Functional Skills – Level 2

Skill	When learners are ...
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	investigating approaches to quality and continuous improvement
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	investigating a modern logistics approach
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	preparing reports and presenting results of their research
Bring together information to suit content and purpose	presenting the results of their investigations
Present information in ways that are fit for purpose and audience	presenting information using a variety of methods
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing their improvement plan
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	comparing quality tools
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	evaluating their improvement plan.