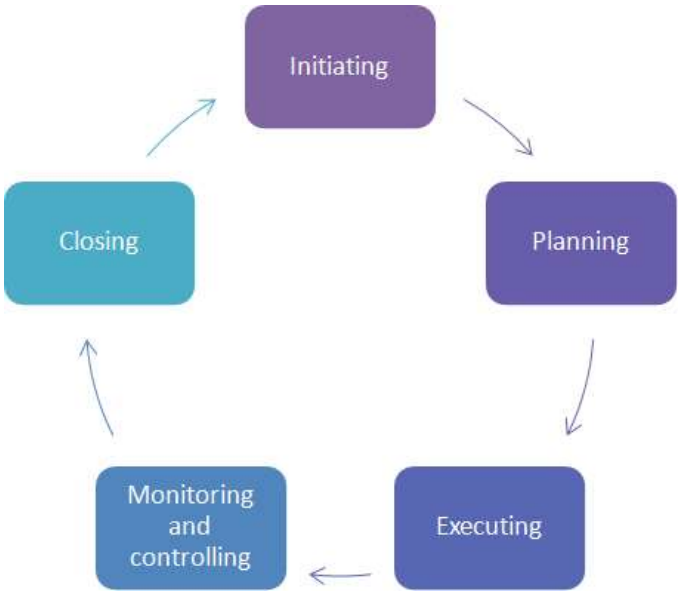
Unit 9: IT Project Management

Delivery guidance

This mandatory unit for the Diploma and Extended Diploma is an opportunity for learners to investigate the principles of project management and different project management methodologies. The reality of IT projects is that without structure and formal process, projects can flounder and fail. Throughout this unit you will support learners in developing a range of essential project management skills based on these five principles:



To deliver this unit, you will need to equip learners with the knowledge they need to help them make the right decisions and identify and use the correct tools for project management.

Learners will develop investigative skills, drawing on other units to support their design activity and taking learning from units such as programming, computer games development, social media in business, graphics, mobile apps development, websites and animation to give them the technical skills they need to design and implement a solution.

If there are opportunities to involve local employers as clients, this will enhance the project and the learner experience.

It would be ideal if the class or course had a social media page, as this is a good way for learners to share some of their documented outcomes as recommended in this guide and the scheme of work.

Approaching the unit

There are many examples of projects available to provide a business context for this subject. Where possible, provide students with examples of successful projects as well as ones that have failed. Both are valuable because they can be analysed against methodologies and best practice.

This might include:

- Projects where the project activity lost sight of the client brief.
- Projects where the client repeatedly changed the brief (often adding new functionality without understanding the impact that this would have on time and cost).
- Projects that were undertaken without stakeholder support and buy-in.
- Projects that were successful, coming in on time and on or below budget.

This unit would benefit from learners having access to IT project managers who could share their experiences and their 'lessons learned'.

Learning aim A: Investigate the principles and methodologies of IT project management as used in industry

This learning aim investigates project methodologies and can be challenging to deliver as the topic can be a little dry. It is essential that learners appreciate that there are multiple ways to approach and manage projects and that some techniques are more useful in certain situations than others.

Since the four methodologies to be studied have different approaches and characteristics, a good way of teaching this is to provide an electronic ‘table’ which learners will complete over the course of this topic and includes some of the key points of comparison. For example, Rapid Application Development (RAD) is a methodology that has a high requirement for physical resources, prototyping and access to users. Therefore, this methodology might not suit a situation involving a large number of stakeholders and future users across a large number of sites as this would add to the cost. The waterfall methodology is intended to 'flow' towards completion, which means it can be difficult to backtrack to an earlier point.

This topic can be made relevant with one or more guest speakers who work as IT project managers. The learners could ask general questions about the role and the types of projects that the managers have been involved with and then use their knowledge of the methodologies to ask directed questions about whether particular characteristics would have worked in the project manager's own activities. The types of questions learners could include: ‘How many users were involved?’ , ‘What were the timescales?’, ‘What were the key challenges?’, ‘Did the client change the brief – if so, how – what was the impact on the project?’, ‘How many people were involved in the project team?’, ‘What roles did they assume?’ and – an important question – ‘What did the review highlight in terms of what could have been done differently?’. In addition, learners could be given a project scenario and asked to choose and justify which methodology would be the most appropriate.

Learners should understand that they need to be able to justify their choice of methodology and that this will be reviewed as part of the review phase of the project development process.

You could also investigate whether a representative from a training provider delivering PRINCE2® courses could visit and tell learners about the courses and certification (particularly as some learners may opt to study such a qualification alongside this course or after completing it).

The final part of this learning aim focuses on the roles and responsibilities of individuals involved in projects and project management across the whole spectrum. You could prepare for this topic by downloading some job descriptions for some of the roles, or by asking your employer contacts to provide some recent job descriptions that they have used in their recruitment.

Learning aim B: Carry out a project initiation for an IT project

While it is likely that this learning aim will begin with an element of tutor-led PowerPoint presentations, learning should be reinforced through practically supporting the topic by giving a case study and allowing learners to put the theory into immediate practice. Good case studies could include projects such as:

- A booking system for technical support tickets for users visiting a local Apple store or other store providing IT technical support – this problem would have to manage advance requests booked online against store drop-ins.
- An online polling system for a TV talent contest which requires members of the public to vote online – this problem would have to manage a reducing number of acts and possible carry-overs of votes from week to week.
- A project to create a search engine with specific functionality (for example, a medical search engine or one for a specific hobby or interest) – this might have complex searching and sorting requirements using various algorithms.
- An interactive portal for a cloud-based storage company to manage technical questions from customers - many companies have Facebook and Twitter accounts and have to work within the constraints imposed by these social media providers.

To prepare this task, you would need to set criteria and either act as the client during the investigation or invite another tutor or member of the technical support team to take that role.

Learners could then practice shaping the scope of the problem, carrying out a short feasibility study and setting project requirements. Learners should consider at least two possible solutions to enable them to make a reasoned judgement about the chosen solution. As this is a practice, the learner would not be expected to write reports and extended documentation but should be able to present what they have learned about the problem and what they would include in a formal document.

You should consider asking learners to create and keep a reflective log where they can write down their reflections about the project process. These logs will help greatly during any review (otherwise they may well forget important aspects of the project development). At a minimum, the log should record the week or date, activity and comments, and learners should record both what went well and what went badly.

Learning aim C: Carry out the planning, execution, monitoring and controlling of an IT project, using an appropriate methodology

The topics in this section are relatively straightforward to teach in that they can be taught in part through small group and whole class discussion, placing some of the concepts in the learners' own context – particularly the topics of planning, risk assessment and the management of resources.

As this is the planning and implementation phase, the same case study used to support the practical aspects of learning aim B could be used to support learning here. Learners focus on prioritisation (the ordering of activity, processes that can happen concurrently or where one process must be completed before another can begin), planning and risk assessment before executing the project and managing the process and the resources. The learners should not attempt to implement the whole project, but only part of it, adjusting timescales accordingly. This will ensure that there will be enough time available for the planning and implementation phase of the unit assessment.

Learning aim D: Undertake the closure of a project by reflecting on the success of personal performance and the project outcome

The final part of this unit is the review phase. To support learning in this area, you should begin by using dictionaries (online or paper based) to define the word 'scope' so that learners understand the full implications of setting project boundaries so that the success or failure of the project can be measured and lessons can be learned.

A range of skills should be investigated. Learners should consider why time planning and management is essential not only for projects, but in general (for example on their course, or in a job situation).

This topic also requires learners to consider the behaviours of individuals involved in project management. Ideally, you should have two or three project management job descriptions available which outline the typical expected behaviours.

Learners should take part in a skills audit that helps them to identify their own strengths and weaknesses, and which gives learners an opportunity to discuss areas for personal development with either their unit tutor and/or their personal tutor.

The approach to this unit should include the following aspects:

- Practical aspects of this unit (excluding the unit assessment itself) would benefit from being linked to a single case study that forms the basis for the practical activity and enables learners to experience the flow of a project from project initiation to review and closure.
- Learners will benefit from reading around the subject with a view to finding examples of both successful and unsuccessful IT projects, which will develop an understanding of potential pitfalls and challenges.
- There is no requirement to use IT- specific project management tools, although it is recommended that learners use commercial project management software such as Microsoft Project or a suitable local alternative as they would benefit from exposure to these tools.
- Guest speakers who work in an IT project management role would enhance the

learner experience by giving real examples of theory put into practice.

- It would be beneficial to invite guest speakers who can introduce learners to an associated qualification, for example, professionals who understand Prince2® .
- Projects chosen for both learning and assessment should be realistic but sufficiently challenging to stretch a level 3 learner. Assessment model (in internally assessed units).

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Investigate the principles and methodologies of IT project management as used in industry	**A1** Project definitions **A2** Characteristics of project management methodologies **A3** Project management structures	A written report on the investigation of principles and methodologies of IT project management as used in industry, using at least three different IT projects as case studies.
B Carry out a project initiation for an IT project	**B1** Project idea generation and solution creation **B2** Feasibility study **B3** Project requirements	A project document portfolio created from implementing either a 'live' or 'simulated' project using an appropriate methodology. Evidence will include planning, preparation, feasibility studies, requirements and records of processes carried out during the planning and execution of a project Written or verbal reports should accompany the evidence where clarifications and justifications are required, and versioned document control should be applied.
C Carry out the planning, execution, monitoring and controlling of an IT project, using an appropriate methodology	**C1** Project phasing **C2** Typical project management processes	
D Undertake the closure of a project by reflecting on the success of personal performance and the project outcome	**D1** Lessons learned from implementing an IT project	A written report or presentation evaluating the outcome of the 'live' or 'simulated' project and reflecting on personal Performance.

Assessment guidance

The assessment for this internally assessed unit would benefit from being divided into three assignments as shown above.

Assignment 1 (Learning aim A):

A researched report focusing on three specific case studies about projects delivered using different project management methodologies.

- The case studies should be real rather than simulated and should be drawn from news articles or academic papers on the internet, IT professional/project management websites or interviews with businesses.
- The learners should use a referencing methodology and provide a bibliography.
- The report should:
    - show that the learner understands the key characteristics of the methodologies and how they have been applied to the IT projects
    - explain the project management structures as applied to IT projects
    - compare the merits of the methodologies (looking at the benefits and limitations of using a methodology) and evaluate their effectiveness and contribution to the success or failure of the project. This will enable learners to access higher grades.
- The report should follow a recognised format (either formal or informal) and should be presented as a professional business document.
- Learners will need to access a range of both published and online sources to provide the academic content.

Assignment 2 (Learning aims B and C):

The feasibility/planning/design and implementation phases of assessment will focus on a business scenario (preferably real rather than simulated). This would enable learners to interview their client to seek clarification about the project.

The evidence should be pulled together as a portfolio, containing documentation and evidence as outlined below.

Using the scenario, the learners should:

- Undertake a feasibility study that should include the investigation of at least two possible solutions, one of which should be chosen for development.
- Demonstrate planning/design of the proposed solution using appropriate tools which may include benefits, diagrams, storyboards, flow charts and other technical information. Screenshots or printouts from project management software will also provide useful evidence.
- Consider risks and monitor the process to ensure quality.
- Implement and test the chosen solution appropriately, with relevant technical documentation produced.
- Apply version control to documentation.

Assignment 3:

This assignment would benefit from being developed as a written report or presentation, with learners evaluating the outcome of the project and reflecting on their own performance.

The evidence should:

- Explain the knowledge and project management skills and techniques used by the learner in the development of the solution.
- Outline the behaviours demonstrated.
- Explore how issues were overcome and outline the lessons learned from being active in the process

Getting started

This table gives you a starting point for one way of delivering the unit, based around the recommended assessment approach in the specification.

Unit 9: IT Project Management
Introduction Introduce the unit using a combination of short YouTube videos, news articles and discussion Learners will use the internet to find examples of IT projects that have either gone well or failed, which they will then share with the class. Learners should carry out an initial skill and behaviors audit to capture their assessment of their own skills. The audit should largely include generic skills and behaviours which would be relevant when contributing to or managing a project. It should also include an element of technical skills, although this can be achieved by simply providing a section where learners can list the technical skills they are good at. This process will be repeated at the end of the unit using the same document.
Learning aim A
A1: Project definitions • Define project and give examples of common IT projects. • Present the phases of the project lifecycle. • Guest speaker gives a presentation to learners on the role of a project manager, followed by an opportunity for learners to ask questions to clarify points and enhance their understanding of the role and its challenges. • Learners explore project management software. **A2: Characteristics of project management methodologies** Before embarking on this topic, give learners a prepared electronic table that will allow them to capture the key points of comparison (such as suitability against timescale or size of user group). **Projects IN Controlled Environments (PRINCE2®)** • Guest speaker from ILX Prince2® to outline the main characteristics of this methodology. Alternatively, use the four videos listed in the Resources section of this delivery guide. • Learners work in groups to explore one of the suggested UK organisational case studies (links provided in the scheme of work) and create a PowerPoint presentation focusing on the case study they were allocated, which they then present to the class. • Using all of the research and resources used in previous activities, learners work in groups to create a visual media artefact that demonstrates their understanding of the Prince2® methodology. • Learners make their own notes on the electronic table. **Rapid Application Development (RAD)** • Tutor presentation on the principles, tools and techniques of RAD. • Learners carry out individual research into CASE tools. • Learners should work in small groups to investigate RAD tools in software

development. A video that explains RAD in Delphi is provided in the scheme of work and learners will then explore the programming environments they use in class and the RAD tools available.

- Using all of the research and resources used in previous activities for this topic, learners work in groups to create an audio media artefact that demonstrates their understanding of the RAD methodology.
- Artefact created in the final activity should be presented to the class for feedback. Learners make their own notes on the electronic table.

Waterfall

- Learners carry out individual research into the waterfall methodology using one resource provided in the scheme of work, but finding an additional two sources to complete the activity.
- A tutor-led class discussion on one of the key disadvantages of the waterfall methodology follows, using a 10-minute video (which can be found on YouTube) illustrating scope creep, followed by further discussion and a 7.5- minute video that outlines strategies to avoid this risk in a project.
- Using all of the research and resources from previous activities for this topic, learners work in groups to create a text-based artefact that demonstrates their understanding of the waterfall methodology and, in particular, how client expectations need to be managed to stay within the constraints of the methodology during the project.
- Artefact created in the final activity should be presented to the class for feedback.
- Learners make their own notes on the electronic table.

Agile

- Small group work to investigate the Agile methodology and the two key variations that are commonly used in industry. Learners prepare teaching materials to later teach other members of the class about the methodology they have chosen (or have been allocated). Some initial links to resources have been provided in the scheme of work.
- Learners use the teaching materials they developed in the previous activity to 'teach' the class.
- Learners make their own notes on the electronic table.
- You should ask learners to carry out a short activity (which could be delivered as a mini-project) in which they prepare a PowerPoint presentation to demonstrate their understanding of the Agile methodology, enhancing it with case studies were possible. The PowerPoint presentation should be presented to the class for feedback.
- To complete the topic, you could ask learners to write an article for a sector journal that formally compares the four methodologies. The completed article should be published on a class social media page.

A3: Project management structures

User requirements:

- This is a relatively short but important topic and would be best delivered as a short PowerPoint presentation that stresses the difference between functional and non-functional requirements.

Project job roles and responsibilities

- Small group activity focusing on investigating job roles for individuals involved in project development and stakeholders. Learners will collaborate within groups to create job descriptions (link to a sector-based professional website provided in the scheme of work). The completed job descriptions will be lodged in a job bank.

Quality assurance, testing and deployment

- To complete the learning aim you will lead a discussion on managing project quality, project testing and deployment. Several links have been included in the scheme of work, providing the source materials to be used in the discussion.

Learning aim B

B1: Project idea generation and solution creation

- In preparing for this topic, you should consider asking learners to create and keep a personal reflective log that they will use when they carry out a feasibility study, create project requirements and then plan, execute, monitor and control their IT project. While this is not compulsory, completing such a log will help learners extensively for learning aim D at the end of this unit.
- You will lead a discussion on project ideas. Four ideas have been provided in this document (see Delivery Guidance), although you are free to include ideas of your own (projects you may have previously used or projects that the learners themselves might suggest).
- Learners work in small groups to investigate the problem idea from three perspectives. Limiting the number of project ideas and allocating the projects used to more than one group will create an opportunity to compare the research carried out by the groups sharing the same project, thereby enabling learners to tweak their projects (if they missed anything key), although you should ask them to stay with their core idea.

B2: Feasibility study

- Create a presentation for learners to prepare them for carrying out the processes involved in a feasibility study: technical, economic, legal, operational, scheduling, sustainability, security and usability. You will need to issue a feasibility study template that they will use to record their study, although they are only required to write notes under each section (not produce a full feasibility report). NB – learners should explore the impact of any local legislation that may impact the project.
- Learners carry out a feasibility study within their groups and recommend two possible solutions. If further support is needed, there are two links to content in the scheme of work to help them in this activity.
- You will need to look over the feasibility studies between the end of this session and the start of the next to ensure that learners are on the right track. There is no requirement for the interpretation of the project to be the same for all groups, but the study and recommendations should make sense before learners move on to project requirements.

B3: Project requirements

- Prepare a project requirements template and walk learners through the sections in the document. There are many online templates that you can adapt and use with your class. Once you have a suitable template, walk and talk learners through the document, explaining what it is and what should be included.
- Learners work in their groups to finalise the requirements using the document. The minimum content is defined in the scheme of work and learners should be instructed to include at least two visual elements from those listed in the spec (diagram, sketch, photograph, storyboard). The document will be completed in note form with supporting diagrams.

Learning aim C

C1: Project phasing

- Prepare a PowerPoint presentation (although this could be a worksheet or other suitable product) and introduce learners to the concept of functional and non-functional requirements. Links for source materials have been provided in the scheme of work.
- You will need to prepare a list of project requirements for learners to use in the paired activity. A presentation/slide number has been provided which could be used to produce this list (and which essentially provides the answer for you).
- Working in their small groups, learners then create a functional versus non-functional requirements list, based on the project requirements document they created in the previous lesson.

C2: Typical project management processes

Typical project management processes

- Understanding how to manage a project is formalised through the use of recognised project management processes. Learners work in pairs or small groups to investigate the project management processes. They should create a PowerPoint presentation targeted at a group of newly recruited project coordinators. Each pair or group should use the presentation slides to explain each of the processes. The final version should be presented to the class.

Planning and monitoring project management processes

- Present the tools used to plan and monitor a project, demonstrating as many of them as possible from a practical perspective, or sharing documented examples with learners that you can walk through with them. What is a resource plan? What are the components? Why are time plans essential? What is a contingency and how can it be factored into a project? How are constraints identified and what happens if further constraints are uncovered during the project? How do you decide appropriate intervals for monitoring and control? Are they always the same intervals or should they vary?
- Learners should practice Gantt charting and critical path analysis using exercises and tutorials (see links in Resources section of this delivery guide).
- As practitioners, learners will have to become resourceful, creating online and paper- based information capture or recording documents to suit different situations. They may achieve this by simply using resources they find online – but it is more likely that they will need to analyse existing documentation and adapt it to make it more relevant to the situation. The activity requires learners to collaborate

as a class to produce supporting documentation that they will ultimately all use as part of their assessed projects.

- Once completed, learners critique the products so that improvements can be made to produce final versions.

Risk and issue processes

- Using videos and web content to stimulate discussion, you should discuss the whole concept of risk, risk severity and contingency with learners from a project and general business perspective. It will help to contextualise risk with personal examples. Links have been provided for you to use for this topic.
- It is useful if learners can investigate at least one project management tool in this area, such as the one listed in the scheme of work from the mindtools website. You can suggest a suitable alternative if one is available on your centre's systems.
- Learners should practice risk assessment by working with their small group on the scenario they have been using for practicing the various components of a project. They should share their assessments with the class, who can sense check for any obvious omissions.

Execution and management processes for a project

- Learners should carry out individual research (preferably using multiple sources) to develop a personal checklist of factors that they believe can influence the success of a project. The checklists should be discussed by the class to highlight similarities and omissions.
- Learners share their checklist with the class. The class then collaborate to identify the most important aspects of the checklist and then create a final version that should be uploaded onto a shared drive or the class social media page.

Learning aim D

D1: Lessons learned from implementing an IT project

- You should now reissue the skills and behaviours audit completed by learners in the first session so that they can revisit the document and make additional observations about where and how they feel they have improved, such as time planning and management, communication, problem-solving and leadership skills.
- Learners should use the internet (or the centre's own learning centre resources if applicable) and identify sources such as videos or other materials that would help them to improve the skills they identified as needing improvement. A combined list of resources from all learners should be published and/or shared with the class.

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

Depending on the choice of project, the following units will provide useful underpinning knowledge and skills that can be drawn on to create the deliverables:

- Unit 1: Information Technology Systems – Strategy Management and Infrastructure
- Unit 2: Creating Systems to Manage Information
- Unit 3: Using Social Media in Business
- Unit 4: Programming
- Unit 6: Website Development
- Unit 7: Mobile Apps Development
- Unit 8: Computer Games Development
- Unit 11: Cyber Security and Incident Management
- Unit 13: Software Testing
- Unit 14: Customising and Integrating Applications
- Unit 15: Cloud Storage and Collaboration Tools
- Unit 18: The Internet of Things.

Further/complimentary study could include:

- Prince2®

Resources

Journals

There are a number of online project management journals that could be considered, but all involve a fee – for example:

- Project, the official journal of the *Association for Project Management (APM)*

Videos

With the exception of the last video (which is generic and provides hints and tips for project managers), the videos below introduce project management concepts in relatively short, manageable parts that are ideal for setting as homework tasks.

- Agile project management tutorial: What is agile project management? (4 minutes)

  YouTube:
- Prince2 project management explained - introduction (3 minutes)
- Prince2 project management explained - principles (6.5 minutes)
- Prince2 project management explained - themes (5 minutes)
- Prince2 project management explained - processes (5 minutes)
- Project management basics for beginners: 13 simple project management tips (5.5 minutes

Websites

Search for the 'Critical Path Method' website – this site provides a problem with solution for learners to practice critical path analysis.

Go to the Mindtools website and search for 'Project Management: Delivering Complex Projects Successfully' – a series of digital tools to support a range of business processes including project management.

Go to the 'project ideas blog' website and search for 'IT Projects for Students' – a number of ideas for projects. Projects in blue can be clicked to show some demo systems to provide an element of inspiration. Projects in black have no demo option.

Go to the Guardian website and search for 'Fred Brooks – complex software projects' for an article on why big IT projects always go wrong – an interesting article that explores the challenges and potential pitfalls of undertaking large-scale IT projects.

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.