

Criteria for the Diploma Qualifications in Information Technology at Levels 1, 2 and 3



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The criteria

Introduction

1. The purpose of this document is to set out the knowledge, understanding and skills requirements for the Diploma in Information Technology (IT) at levels 1, 2 and 3.
2. The Ofqual document *Criteria for Foundation, Higher and Advanced Diploma Qualifications* defines the overarching criteria for all diplomas at levels 1, 2 and 3, and should be read in conjunction with this document.

Aims

3. The general aims of the Diplomas are identified in Section 2 of the document *Criteria for Foundation, Higher and Advanced Diploma Qualifications*.
4. The Diploma in IT is for all learners and has particular relevance to 14- to 19-year-old learners who seek to acquire knowledge and develop skills in the broad context of the IT and telecommunications sector. It is intended to help transform technology-related education for learners, accelerating the UK's ability to compete in an increasingly demanding global environment.

Structure

Structure of Diplomas in IT			
<i>Level</i>	<i>Foundation</i>	<i>Higher</i>	<i>Advanced</i>
Total GLH	600	800	1080
Principal learning GLH	240	420	540
Generic learning GLH	240	200	180
Additional/ specialist GLH	120	180	360

Foundation level

Summary of topic titles

At level 1, all learners taking a Diploma in IT must complete topics 1, 2 and 3.

Topic no.	Title	GLH
1.1	The digital world	60
1.2	Working with people	60
1.3	Working with technology	60
1.4	Multimedia	60

Topic 1.1: The digital world (60 GLH)

Purpose

- Using topical examples from industry, learners will be introduced to the world of digital technology, investigating ways in which technology can help organisations and individuals to achieve their objectives.

Scope of content

Learners will:

- investigate the contribution of technology to a range of organisations;
- explore how technology is changing the way organisations and individuals operate;
- identify key components of technology systems as used in business;
- describe how technology is contributing to meeting the needs of specific organisations;
- suggest why example organisations should implement or improve a technology system.

Learners will evidence transferable skills including English and communications skills, mathematics, problem solving and creative thinking.

Topic 1.2: Working with people (60 GLH)

Purpose

6. Learners will develop communication skills appropriate to the business environment, including written and spoken English, and an appreciation of personal styles and group dynamics.

Scope of content

Learners will:

- a) explore the use and implications of different media and channels for communication;
- b) experience and reflect on the workings of teams and the different roles individuals play within teams;
- c) consider the impact of different behaviours, personal styles and actions in terms of effective communication and achievement of objectives;
- d) use clear, appropriate English and demonstrate numeracy in a range of simple business-related communications, including written, digital and verbal media;
- e) demonstrate self-awareness, active listening skills, and effective, confident speaking skills.

Learners will evidence transferable skills including English (specifically grammar, spelling and punctuation), use of information and communication technology (ICT), mathematics and team-working.

Topic 1.3: Working with technology (60 GLH)

Purpose

7. Learners will be introduced to the basics of technology systems, using topical contexts. They will design, develop and test a simple technology system to meet a defined need and apply problem-solving skills in a technical environment.

Scope of content

Learners will:

- a) acquire skills in the basics of systems, databases, network connections and security;
- b) install and use a technology system for a specific purpose;*
- c) understand the basic principles of problem solving, applying them to address simple problems in a technology system.

Learners will evidence transferable skills including English and communications, use of ICT, problem solving and creative thinking.

Topic 1.4: Multimedia (60 GLH)

Purpose

- 8. Learners will develop an understanding of multimedia technology. This will include the design and development of a multimedia product that demonstrates technical competence and awareness of audience needs.

Scope of content

Learners will:

- a) explore the use of different digital media for communications in a range of business contexts;
- b) understand the basics of preparing digital media including file size, format, resolution, compression, transfer times and accessibility;
- c) design and develop a multimedia product to meet a specified communications requirement for a particular audience*
- d) seek feedback from the target audience and make suggestions to improve the product.

* This may be further evidenced through the project.

* This may be further evidenced through the project.

Learners will evidence transferable skills including English and communications, use of ICT, creative thinking and reflective learning.

Links with other topics

The knowledge, understanding and skills gained in topics 1, 2 and 3 will underpin successful completion of this topic.

Higher level

Summary of topic titles

9. All topics are linked and have interdependencies. The successful completion of any given topic depends on the knowledge, understanding and skills developed through other topics; the curriculum requires careful sequencing of learning to provide this holistic experience.

Topic no.	Title	GLH
2.1	The potential of technology	60
2.2	Exploring organisations	60
2.3	Effective communication	60
2.4	Skills for innovation	60
2.5	Technology systems	60
2.6	Multimedia	60
2.7	Managing projects	60

Topic 2.1: The potential of technology (60 GLH)

Purpose

10. Using topical examples, learners will explore the transformational effect of technology on society, organisations and individuals and examine the

ways in which technology can help organisations and individuals to achieve their objectives.

Scope of content

Learners will:

- a) investigate the role and contribution of technology to the success of a range of organisations, including impact on efficiency and competitiveness;
- b) describe how technology is changing the way organisations, individuals and society operate;
- c) identify key components of technology systems, explaining their function in different business scenarios;
- d) explain why example organisations should implement or improve a technology system.

Learners will evidence transferable skills including English and communications and creative thinking.

Topic 2.2: Exploring organisations (60 GLH)

Purpose

11. Using current examples from industry, learners will develop their understanding of enterprise and organisations, including exploring technology-enabled business processes.

Scope of content

Learners will:

- a) research and describe different organisational structures, cultures and roles;
- b) describe the purpose of key business processes, including customer relationship management, people management, supplier management and service delivery;
- c) illustrate the use of technology to support business processes, describing what technology is used and what benefits it delivers;

- d) explore key factors in an organisation's success, learning through running a simulated mini-enterprise.

Learners will evidence transferable skills including English and communications, mathematics, use of ICT, team-working, critical analysis and problem solving, creative thinking and reflective learning.

Topic 2.3: Effective communication (60 GLH)

Purpose

12. Learners will develop their ability to communicate and operate effectively in a business-like environment, including understanding teams, communication methods and the consequences of different behaviours.

Scope of content

Learners will:

- experiment with different media for communication, assessing implications and appropriateness in a wide range of business contexts;
- identify and demonstrate the features of effective communication between individuals and groups, with particular focus on understanding how teams work;
- explore and reflect on the consequences of different behaviours, attitudes and actions in terms of effective communication and performance;
- demonstrate confident, correct and contextually appropriate English in a range of communications appropriate to the business environment, including meetings, short reports, emails, telephone calls and presentations;
- evaluate personal performance as an individual and as a member of a team, including offering and responding constructively to feedback.

Learners will evidence transferable skills including English and communications (with particular focus on grammar, spelling and punctuation), use of ICT, team-working, creative thinking and reflective learning.

Topic 2.4: Skills for innovation (60 GLH)

Purpose

13. Learners will develop the ability to create proposals to address business challenges and opportunities. This includes the use of creative, investigative and numerical reasoning skills and the interpersonal skills needed to negotiate agreements.

Scope of content

Learners will:

- a) develop mathematical competence using a wide range of numerical and graphical techniques to analyse and present business-relevant information, including the use of estimation and approximation to support ideas and proposals;
- b) use creative, investigative and numerical reasoning skills to present proposals to address business challenges and opportunities. This is to include:
 - identifying opportunities for improvement in a range of example business scenarios;
 - generating a number of options to address each challenge/opportunity and comparing and assessing their relative merits;
 - creating recommendations for action that demonstrate innovation, creativity and adaptability;
 - seeking agreement for these recommendations and demonstrating skills in persuasion and negotiation;
- c) explain key legal and ethical considerations in the IT environment, including data protection, health and safety and copyright.

Learners will evidence transferable skills including English and communications (with particular focus on grammar, spelling and punctuation), mathematics (applied in the business context and including confident use of numbers without calculators or personal computers), use of ICT, team-working, creative thinking and reflective learning.

Topic 2.5: Technology systems (60 GLH)

Purpose

14. Learners will assemble business-relevant technology systems, design, develop and test simple programs and understand the principles of systems availability.

Scope of content

Learners will:

- a) understand the role of key components of networked personal computer systems;
- b) assemble a business-relevant technology system including networked personal computers and software applications;
- c) acquire skills in script programming and the use of macros;
- d) acquire skills in creating, populating, searching and sorting single-table databases;
- e) design, develop and test simple systems (including programs) to meet identified business needs;*
- f) seek feedback, review the system and identify opportunities for improvement;*
- g) understand the principles of systems availability, including implementing appropriate file structures, security and backup processes;
- h) resolve problems within a small-scale technology environment, including viruses and simple user errors.

Learners will evidence transferable skills including English and communications, use of ICT and problem solving.*

* This may be further evidenced through the project.

Topic 2.6: Multimedia (60 GLH)

Purpose

15. Learners will develop their understanding of contemporary digital media and its application for communication and entertainment. They will design and produce a multimedia product that demonstrates an understanding of business requirements, technical competence and awareness of audience needs.

Scope of content

Learners will:

- a) investigate the use of digital media to meet different business-relevant objectives;
- b) acquire technical knowledge and skills to enhance web pages for a given purpose through the use of multimedia content (such as images, graphics, timeline-based animation, video and sound);
- c) design, develop and test a multimedia product that meets the needs of a specific audience and purpose;
- d) evaluate feedback from the target audience, identifying opportunities for improvement.

Learners will evidence transferable skills including English and communications, use of ICT, problem solving, self-management, creative thinking and reflective learning.

Topic 2.7: Managing projects (60 GLH)

Purpose

16. Learners will understand the principles of planning and executing a project and how this process is used in business. This knowledge will be applied in the development of task-based project plans for technology-related solutions.

Scope of content

Learners will:

- a) understand project management fundamentals as applied to simple projects, including task breakdown, estimating timescales, defining dependencies and establishing the critical path;
- b) investigate key factors in the success or failure of business projects;
- c) be introduced to current project management software tools;
- d) develop simple task-based project plans, including plans for small-scale technology enabled solutions;*
- e) describe the implications of changing external factors on project plans in a range of scenarios.

Learners will evidence transferable skills including English and communications, use of ICT, critical analysis and problem solving, self-management and creative thinking.

Advanced level

Summary of topic titles

17. All topics are linked and have interdependencies. The successful completion of any given topic depends on the knowledge, understanding and skills developed through other topics; the curriculum requires careful sequencing of learning to provide this holistic experience.

* This may include the project plan for the project.

Topic no.	Title	GLH
3.1	The potential of technology	60
3.2	Understanding organisations	60
3.3	Professional development	90
3.4	Creating technology solutions	90
3.5	Multimedia and digital projects	90
3.6	Making projects successful	90
3.7	Managing technology systems	60

Topic 3.1: The potential of technology (60 GLH)

Purpose

18. Using topical examples, learners will explore the impacts and contribution of technology to society, organisations and individuals. This will include a particular focus on global business competitiveness and the transformational effects of the internet and mobile communications.

Scope of content

Learners will:

- a) investigate the role of legacy systems and emerging technologies in achieving organisations' goals in a number of sectors (including commercial, public and voluntary);
- b) explore how organisations and individuals innovate through and with technology to improve competitiveness and/or service;
- c) identify and assess examples of success and failure in companies' exploitation of technology;
- d) generate ideas for innovation and technology-enabled business solutions;
- e) assess the benefits of introducing different types of technology systems into a range of organisations, highlighting opportunities and risks.

Learners will evidence transferable skills including English and creative thinking.

Topic 3.2: Understanding organisations (60 GLH)

Purpose

19. Learners will evaluate differences in companies' organisational structures and styles and explain the key factors underpinning successful business performance, with particular reference to business processes and the impact of technology systems.

Scope of content

Learners will:

- a) consider how organisational types and structures relate to organisations' differing objectives and describe typical business functions, roles and responsibilities within technology and other sectors;
- b) describe the principles of key technology-enabled business processes, including those relating to customers, suppliers, product development, service delivery and management and incorporating local, national and global dimensions (for example global sourcing);

- c) run a simulated mini-enterprise to identify and assess the implications of internal and external factors that impact on organisational performance, and to consider the effects of different courses of action a company might take in response to external stimuli;
- d) evaluate success and risk indicators for organisations, including assessing companies' financial health and competitive pressures;
- e) assess the implications of introducing different types of technology systems into an organisation, identifying types of technology appropriate to different environments in example business scenarios.

Learners will evidence transferable skills including English, use of ICT, mathematics, team-working, problem solving, critical analysis, creative thinking and reflective learning.

Topic 3.3: Professional development (90 GLH)

Purpose

20. Learners will develop the capacity to communicate and operate effectively in the modern business environment. This includes the principles of professional practice, business analysis and business case development along with skills in handling customer problems, presenting proposals, negotiating and operating in a team.

Scope of content

Learners will:

- a) understand the principles of effective communications in business and assess the implications of using different communications media in meeting different organisational objectives;
- b) contrast differing personal styles and behaviours and evaluate their impact on others in team and one-on-one situations;
- c) demonstrate correct, contextually appropriate and effective English (through written, spoken and digital media) in a range of common business situations, including handling customer problems (written and spoken), presenting proposals (written and spoken), writing progress reports (including summaries), negotiating and operating in a team;
- d) evaluate personal performance and offer and respond constructively to feedback;

- e) analyse and document a range of business processes from example organisations and undertake a structured business analysis of weaknesses and opportunities for improvement via technology enablement
- f) confidently apply mathematical concepts (with and without calculators or personal computers), including the use of complex calculations, statistical analysis, probability and estimation, in order to understand business dynamics and solve business problems such as analysing profits, estimating sales volumes and costs, assessing return on investment and undertaking competitive analysis;
- g) develop and present compelling business cases for technology-enabled solutions, including assessment of business benefits, impacts, risks and return on investment.

This is to include:

- a) identifying opportunities for improvement in a range of example business scenarios;
- b) generating a number of options to address each challenge/opportunity, evaluating their relative merits;
- c) constructing recommendations for action that demonstrate innovation, creativity and adaptability;
- d) seeking agreement for these recommendations, demonstrating skills in persuasion and negotiation;
- e) understand the principles of ethics, corporate social responsibility, professionalism and codes of practice and the implications of legal requirements related to IT such as data protection, health and safety and copyright.

Learners will evidence transferable skills including English (including grammar, spelling and punctuation), use of ICT, mathematics (applied in the business context and including confident use of numbers without calculators or personal computers), communications, critical analysis and problem solving, team-working and reflective learning.

Topic 3.4: Creating technology solutions (90 GLH)

Purpose

21. Learners will gain a solid understanding of technology fundamentals, including design principles, data analysis and programming basics. Developing understanding of the solutions life cycle, this learning will be rooted in topical contexts and link technology solutions to organisational needs.

Scope of content

Learners will:

- a) understand the role and interaction of key components of technology systems (for example programming language and database systems) in a range of typical current business environments;
- b) explain the principles of integration and interaction between different business systems, including an appreciation of interfaces, data structures and protocols;
- c) understand the principles of the solutions life cycle;
- d) design, develop, test and implement a small-scale technology-enabled solution* using the three-tier architecture of user interface, program code and relational database. This will involve using industry-standard approaches for:
 - requirements specification, based on business analysis (see topic 3);
 - solution design, including data analysis and database design;
 - solution development, including the use of an industry-standard programming language;
 - testing and implementation;
- e) create a user guide for the solution;

* This solution is to be distinctively different from the multimedia solution of topic 5. Learning in this topic may be further evidenced through the project.

- f) seek feedback, review the system and prioritise opportunities for improvement.

Learners will evidence transferable skills including English and communications, use of ICT, critical analysis, problem solving, self-management and creative thinking.

Note: This topic is intended to provide a solid grasp of technology fundamentals to underpin the other principal learning in the Diploma. Linkage with the business analysis within topic 3 should be drawn out.

Topic 3.5: Multimedia and digital projects (90 GLH)

Purpose

- 22. Learners will develop a project-based approach to developing contemporary digital media solutions, leading to the design and development of a creative multimedia product that demonstrates an understanding of business requirements, technical competence and awareness of audience needs.

Scope of content

Learners will:

- a) investigate the use of different types of digital media to represent different content needs;
- b) understand the principles of planning, designing, developing, testing and implementing multimedia solutions, including assessing business requirements and audience needs;
- c) acquire the technical knowledge and skills to create and integrate a range of multimedia components, including text, images, sound, video and timeline-based animation;
- d) design, develop and test a creative multimedia product, integrating a range of multimedia components to communicate effectively with a defined audience for a particular purpose;
- e) design, develop and test an informational website to meet the needs of a particular client, creating linked, web-ready pages containing integrated multimedia components;
- f) assess the impact and effectiveness of the multimedia products and websites developed in this topic, prioritising opportunities for improvement.

Learners will evidence transferable skills including English and communications, use of ICT, critical analysis, problem solving, self-management and reflective learning.

Topic 3.6: Making projects successful (90 GLH)

Purpose

23. Learners will understand the principles of the project life cycle and its application in organisations, identifying key factors in the success or failure of projects. They will develop high-quality project plans relevant to realistic work environments, including project plans for new technology-enabled solutions.

Scope of content

Learners will:

- a) understand the principles of project management, including stakeholder analysis, scope definition, task breakdown, estimating timescales and costs, defining dependencies, assessing risk, establishing the critical path and establishing monitoring and reporting mechanisms;
- b) evaluate key factors in the success or failure of projects, including technology-enabled solutions in real-world environments, based on an understanding of the project life cycle and the principles and benefits of effective project planning and project management;
- c) develop project plans, including plans for technology-enabled solutions, using industry standard approaches and current project management software tools and focusing specifically on risk assessment and progress tracking;
- d) apply, review and improve project management techniques;*
- e) assess the implications of changing external factors on project plans in a range of scenarios, adapting plans appropriately.

* For example in topic 5 and in the project.

Learners will evidence transferable skills including English and communications, use of ICT, critical analysis, problem solving, self-management, creative thinking and reflective learning.

Topic 3.7: Managing technology systems (60 GLH)

Purpose

24. Learners will develop the capability to manage small-scale live technology system operations to meet a customer's business requirements, including systems availability, networking, security, problem solving and change management.

Scope of content

Learners will:

- a) understand core techniques for managing the availability and security of technology systems, including maintenance, database administration, capacity planning and backup and recovery procedures;
- b) understand the principles of effective change management for technology systems;
- c) develop the technical understanding and logical processes needed to assess the impact of, and address problems in, technology systems;
- d) configure a small-scale system suitable for business use, including mobile and fixed-line communications, networking and security;
- e) plan the implementation and testing of systems change in response to new business requirements;
- f) handle problems such as software bugs, viruses and user errors, demonstrating appropriate incident management, use of support tools and techniques and reporting.

Learners will evidence transferable skills including English and communications, use of ICT, critical analysis and problem solving.

Specialist learning

25. This section sets out the specialist areas that can be included as options for specialist learning. Component awarding organisation specialist learning qualifications and units must:

- further develop and complement the sector-relevant knowledge and skills set out in the principal learning constituent qualification;
- not duplicate knowledge and skills set out in the principal learning constituent qualification;
- enable specialisation in one or more of the areas listed below for each level.

Level 1 and 2 specialist learning by type

Type	Specialist area	Purpose
IT industry certifications: those subjects which are formally mapped to the National Curriculum Framework	As specified in the qualifications	Learners will broaden and deepen their knowledge, understanding and skills.
Other existing IT related qualifications: subject to the requirement to not duplicate knowledge and skills set out in principal learning	As specified in the qualifications	Learners will broaden and deepen their knowledge, understanding and skills.

Level 3 specialist learning by type

Type	Specialist area	Purpose
IT industry certifications	As specified in the qualifications	Learners will further broaden, deepen and apply their knowledge, understanding and skills
Other existing IT related qualifications	As specified in the qualifications	Learners will further broaden, deepen and apply their knowledge, understanding and skills.
Specific Diploma content	Programming	This will build on principal learning to provide a

		<p>solution-focused approach to developing business applications, introducing advanced software development practice. This will provide an insight into real problem solving and solutions development. It will include implementing and testing solutions in a development environment, enhancing the user interface, validating user input, object-oriented programming, creating procedures, working with data and deploying applications.</p>
	<p>Web development</p>	<p>This will provide the knowledge, understanding and skills to develop business-focused applications for the web. Building on principal learning, it will provide a solid grounding in the development of content, structure and attractive interfaces as essential aspects of developing successful web-based systems. Learners will cover creating HTML, web application development, web languages, web forms, adding functionality to web applications, web databases, introducing XML and deploying web</p>

		applications.
	Computer game development	Building on principal learning, this will introduce the knowledge, understanding and skills required to incorporate the principles of game design, planning and development to a multimedia game product. This will include game concepts, video game design, 2D animation, 3D animation, storyboarding and project management, game programming, sound features and a game project.
	Technopreneurship	This will build on principal learning to provide an understanding of how to exploit technology for new business. This will include entrepreneurship and business planning, new venture marketing, technology evaluation and commercialisation, developing new business models for emerging technologies, technology innovation and design, business strategy and managing growth, financing, case studies and a technopreneurship project.

Annex A: Glossary of terms

This annex provides a glossary of terms as used in the Diploma in IT.

Business analysis

26. Business analysis is a structured methodology focused on understanding customers' needs and identifying how best to meet those needs. The purpose of business analysis is to establish or improve business processes in support of an organisation's objectives, specifically including the use of technology.

Business case

27. A business case is a formal document used to define and justify investment in a proposal prior to a project being defined. It normally includes an introduction, management summary, description of the current situation, options considered, analysis of costs and benefits, impact assessment, risk assessment, recommendations and appendices of supporting information. In the context of the Diploma, it is used to promote innovation and creativity, the translation of ideas into practical proposals and the effective application of English and mathematics in the business context.

Business problem

28. A business problem is a problem that relates to an organisation's operations or services, for example in product quality, service delivery or cost management.

Business process

29. A business process is a description of a set of sequenced and interrelated tasks and outcomes associated with an organisation's activities. It is often illustrated with diagrams, depicting tasks, roles, resources and actions to be taken in order to meet the organisation's objectives. Business processes include, for example, processes to deliver goods or services to customers or to support activities such as recruitment or logistics.

Change management

30. Within the IT discipline, change management refers to the techniques used to formally control the process of making changes to technology systems in order to maximise benefits and minimise the risk of failure. To ensure successful adoption and exploitation of technology, change management typically encompasses the interdependent matters of organisational, process and systems change.

Customer relationship management (CRM)

31. Customer relationship management refers to the methods and technologies used by organisations to manage their relationships with clients. CRM systems are integrated end-to-end across marketing, sales and customer service.

Database

32. A database is a collection of records stored in a computer in a systematic way so that a computer program can consult it to answer questions. The items retrieved in answer to queries become information that can be used to make decisions. The computer program used to manage and query a database is known as a database management system. See also 'Relational Database'.

Design

33. Solution design leads on from business analysis in the solutions lifecycle. Starting with requirements definition, it includes defining the architecture of the technology system and the interfaces between the various elements of software and hardware.

Develop

34. Solution development leads on from solution design in the solutions life cycle. It is the process of interpreting and executing the design to turn it into a physical system. This typically includes building databases, programs and user interfaces.

Global sourcing

35. Global sourcing refers to procurement of goods or services across international borders. In the context of IT, it typically refers to the sourcing of labour, often for technical work such as systems design, development and testing.

Legacy systems

36. A legacy system is an existing, relatively longstanding computer system or application program that continues to be used because the organisation does not want to, or cannot practically, replace or redesign it. Legacy systems often use older-generation programming languages and database systems.

Macro

37. In this context, the term macro refers to a saved sequence of commands or keyboard strokes that can be stored and then recalled with a single command or keyboard stroke.

Multimedia

38. Multimedia refers to the integration into a single digital object or collection of several presentation media types, typically text, motion video, sound, animation and/or graphics.

Network connection

39. The term network connection in this context refers to the linking of a computer to a computer, or a computer to the internet via fixed line or wireless connections.

Programming

40. Programming is the creation of a set of instructions that tells a computer what to do. Program modules are coded to implement a solution design. In computer programming, a script is a program or sequence of instructions that is interpreted or carried out by another program rather than by the computer processor (as is the case for a compiled program). Script languages include Perl and JavaScript. Compiled languages include C and C++.

Project

41. A project is a set of activities with a defined start point and defined end state, which pursues a defined goal and uses a defined set of resources.

Project life cycle

42. The project life cycle refers to the events, from beginning to end, necessary to design and execute a project in order to meet its defined objectives. Stages include project definition, initiation, delivery, evaluation and reporting.

Project management

43. Project management is the discipline of organising and managing resources in such a way that these resources deliver all of the work required to complete a project within defined scope, time and cost constraints. Project management requires a methodical approach to planning and executing a project through its life cycle.

Proposal

44. A proposal is the formal representation of an idea. In this context, it involves setting out an idea, with the objective of securing support for its implementation.

Relational database

45. A relational database is a collection of data items organised as a set of formally described tables from which data can be accessed or reassembled in different forms without having to reorganise the database tables. The standard use and application program interface to a relational database is the Structured Query Language (SQL). See also 'Database'.

Return on investment (ROI)

46. Return on investment refers to how much profit or cost saving is realised through a given use of money in an organisation, such as investment in technology systems. An ROI calculation is often used in the development of a business case.

Script

47. See 'Programming'.

Solution

48. A solution in the IT context refers to a technology-enabled solution to address a business problem or opportunity. The term solution is often used to imply breadth of scope, for example the inclusion of business and people-oriented factors as well as the technology system itself.

Solutions life cycle

49. The solutions life cycle refers to the course of creating a technology solution from its conception to end of life. This is usually depicted as a circular process utilising project and change management methodologies and comprising business analysis and requirements specification, solution design, solution development, test, implementation and evaluation, and operation and maintenance.

System

50. A system is a collection of elements or components that are organised for a common purpose. An IT system consists of hardware and software components, including programs, databases and user interfaces.

Systems architecture

51. Systems architecture refers to the specifying of the overall structure of a technology solution, including defining the logical components and inter-relationships of computers, devices, operating systems, applications and networks.

Technology

52. Technology in this context is used to encompass computing, communications, networks, the internet, software and all other components used within information systems.

Testing

53. Testing is the process used to help identify the correctness, completeness, security, and quality of a technology solution. Testing is often described in terms of its scope, for example 'end-to-end system test' or 'user-acceptance test'.

Annex B: Possible activities

54. The following tables support but do not form part of the regulatory criteria set out in the body of this document. They provide examples of possible activities through which learners might develop the knowledge, understanding and skills set out in the criteria. These examples are provided to aid understanding.

Level 1 Diploma – principal learning

1. The digital world (60 GLH)

55. Learners could choose example businesses with which they have personal experience (for example music download retailer, a sports centre or a newsagent). They could draw a simple process chart of what occurs from a customer perspective and identify the use of IT within the process. They will be introduced to the key components of technology systems such as software applications, customer databases and websites and their basic purposes for a company. Revisiting their example businesses, they could describe how this technology is helping the business, for example web presence is increasing revenue or automated stock control is reducing costs. They could then identify an example of an improvement a local company might make by using technology differently.

2. Working with people (60 GLH)

56. Learners could identify examples of good and bad communication in documents, telephone calls, texts, blogs, websites and email. They could consider how to select the most appropriate method for different circumstances.
57. Learners could be introduced to team-working and effective communication using adapted versions of personal development courses from industry. This would include developing understanding of different behaviours in team settings, helping learners to explore and handle differences of opinion and offering experience in achieving collective conclusions. It could include the use of videos based in work settings as well as practical exercises in the learning environment.
58. Learners could be expected to make presentations to a peer group, including reflecting on the performance of themselves and others. They could write a CV for a part-time job, role-play handling a customer complaint or write a letter to a company suggesting a new service.

3. Working with technology (60 GLH)

59. Learners could develop their understanding in the context of a networked personal computer system that would be appropriate for home use. They could learn to create a system including installing application software, connecting to broadband and registering for a hotmail account. When simple problems are introduced, such as a mouse malfunction or the need to uninstall and reinstall software, they are able to follow a logical process to log errors, use help functions and seek support from a helpdesk.

4. Multimedia (60 GLH)

60. Learners could consider the use of image, music, video and audio in popular websites. They could design and develop a product to promote a gig or share a travel experience with their fellow learners, having first identified the objectives the product should achieve.

Level 2 Diploma – principal learning

1. The potential of technology (60 GLH)

61. Learners could investigate new types of businesses enabled by the growth of the internet, such as search engines, music download sites or online auctions. They could explore the main reasons organisations use technology, for example to increase market reach, improve customer service or save costs. This could include research of case studies from a variety of industry sectors and visits to local companies.
62. Learners could consider the impact of the UK's e-government strategy on society and the rise of off-shoring. They could investigate organisations with which they have personal experience and identify what types of technology they use and why. They could identify examples of local companies where they think improvements in technology systems could be made – for example a bookshop might introduce online ordering, a B&B could create a website or a warehouse could use cameras, personal computers and the internet to provide improved physical security.

2. Exploring organisations (60 GLH)

63. Learners could visit a real or simulated workplace to find out about organisational structure and roles, drawing up and comparing organisation charts for different types of companies. They could study the principles of key business processes and interview staff in local organisations such as a cinema or sports centre to find out how they

work in practice, in particular identifying where technology is used and why. They could draw the business process and compare and contrast similar business processes as applied in different organisations. Working in competitive teams, learners could run a simulated mini-enterprise using approach software and test out the results of different actions.

3. Effective communications (60 GLH – year 1)

64. Learners could investigate the growth and use of communications media such as blogs, websites, mobile telephony and email, identifying examples of good and bad practice. They could undertake personal development courses that enable them to understand, practise and develop team skills, including leadership, negotiation and handling conflict.
65. Knowledge and use of English could be developed through vehicles such as writing a CV and cover letter for a part-time job, making a written recommendation to the school to make a change or role playing handling customer complaints. They could critique a contract or a proposal to identify problems likely to arise from inaccurate use of language. They could practise writing a business report, for example summarising the results of independent research.

4. Skills for innovation (60 GLH – year 2)

66. Learners could undertake this topic using a wide range of examples from case studies or local businesses. For example, the school registration system does not provide information quickly enough. A gym wants to be able to inform members of new developments in which they might be interested. A dental surgery wants to consider moving to computerised records but isn't sure of the benefits and risks.

5. Technology systems (60 GLH)

67. Learners could develop their understanding in the context of a networked personal computer system that would be appropriate for home use. This could include installing hardware, application software, email, security, networks and broadband. They could create a simple solution to address a challenge identified in topic 4 (Skills for innovation). When a common problem is introduced, such as a security violation or non-functioning internet connection, they could follow an appropriate logic and use help functions to address them.

6. Multimedia (60 GLH)

68. Learners could research and compare the use of digital media in advertising, film and gaming, considering different uses for different objectives. They could design and develop a multimedia product to promote a fundraising event or a business, first having assessed audience needs and business objectives. They could demonstrate the product to an audience of peers or a panel of employers, seeking feedback and presenting back their proposals for improvement.

7. Managing projects (60 GLH)

Learners could consider projects both involving technology and not involving technology. They could create a project plan for going on holiday or organising a gig, learning about task breakdown, dependencies and critical path analysis. They could write project plans supported by Gantt charts to share their plan with a colleague. They could, in teams, deliver a plan that has to be adapted in the light of changed external factors such as the delivery date being brought forward or a cut in funding.

Level 3 Diploma – principal learning

1. The potential of technology (60 GLH)

69. Learners could research the contribution of technology in banking, retailing or government (for example the transformation of voting in South Africa). They could explore the emergence of new online business models in the music industry, the use of database systems in the health sector or the impact of mobile communications in the media. They could investigate the dot.com boom and the rise of e-commerce, commenting on successful and unsuccessful examples. They could consider the emergence of blogs, wikis and other social software. They could use team exercises to develop ideas that would help local businesses, such as a hotel, veterinarian or radio station. They could learn techniques such as SWOT analysis to help assess the benefits of a fashion chain, setting up an online store or a supermarket introducing automated stock management.

2. Understanding organisations (60 GLH)

70. Learners could compare the organisational differences between internet businesses and traditional high street retail companies, or between those in the public sector and the private sector. They could cover the roles of IT professionals as well as the roles of sales and marketing, research, development, finance, procurement and logistics. Business

simulation games could be played in teams to learn about the effects of different decisions on business outcomes. Learners could assess the implications on a company of introducing systems ranging from online sales to mobile office to records management. This could cover addressing new markets, reducing costs, effects on employees and organisational management and skills needs.

3. Professional development (90 GLH)

71. Learners could identify the impact of good/bad practice in a range of realistic business communications such as assessing a badly worded contract for an IT project or handling a customer complaint. They could explore the principles of Myers Briggs or similar tools and analyse the interactions of team members in example video case studies. They could undertake adapted professional development courses from industry, including role playing in negotiating, sales or interview scenarios. They could analyse the opportunities and threats to a local business, given changing competition.
72. Using real examples, learners could investigate and analyse business processes such as customer relationship management for a charity, supplier management for a plumbing business or service delivery in an IT support company. They could create a business case for a website for a voluntary sector organisation or for a mobile office solution for a sports promotion company.

4. Creating technology solutions (90 GLH)

73. Learners could relate the three-tier architecture to a range of popular applications, including travel bookings or online banking. They could create a download music storage system with search and retrieval application, or a technology solution to support a football mini league, a fundraising campaign or a business process within the school environment (for example canteen ordering).

5. Multimedia and digital projects (90 GLH)

74. Learners could explore leading-edge use of multimedia, including in computer games, movies, the internet and virtual worlds. They could create a school or town website with graphics, a movie and animation. They could use multimedia to demonstrate technical competencies learnt in topic 4, and/or to support the business case developed in topic 3. They could create a product to showcase learning in other subject areas, such as an animated sequence describing an insect lifecycle.

6. Making projects successful (90 GLH)

75. Learners could analyse topical case studies such as IT projects in the NHS or private sector. They could work in teams to critique example project plans (both related to IT and not related to IT) in order to identify strengths and weaknesses. They could create a project plan, supported by a Gantt chart, for a project such as organising an event, which then has to be reworked due to the date being brought forward or key personnel becoming unavailable. They could develop a project plan to establish the technology infrastructure for a small multimedia business, including planning the specification, purpose and installation of hardware and software. The project plan would include timelines, milestones, resource and skill needs, risk assessment and mitigation plans.

7. Managing technology systems (60 GLH)

76. Learners could configure a networked personal computer system suitable for a small estate agency, including setting up security systems and maintenance procedures. They could implement changes such as software upgrades, demonstrating effective change management processes to ensure continuous systems availability. They could plan for the upgrade of their school or college's IT systems. They could learn how IT support companies handle and resolve customer problems and apply those techniques in example scenarios.

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