

Occupation Profile

Modern Apprenticeship in Digital Technology - Software Development Pathway at SCQF Level 6

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Purpose:

This occupation profile consists of 9 work situations routinely carried out in software development roles. Collectively these describe all the performance requirements and knowledge and understanding requirements apprentices need to demonstrate competence in the occupation. Each work situation has a unique reference number and is set out as follows:

- Work situation title, goal, brief outline, performance requirements and knowledge and understanding requirements



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Goal of work situation:

To select and apply tools and techniques to solve workplace problems in line with organisational procedures.

Brief outline:

This involves individuals identifying and exploring problems, selecting appropriate approaches, planning problem-solving steps, carrying out and assessing problem resolutions. This also includes documenting problems, resolutions and outcomes.

Performance requirements

1. Diagnosing problems to identify the key characteristics, who it affects, the impact and urgency to resolve it
2. Selecting and justifying the most appropriate problem-solving techniques in line with organisational procedures
3. Developing step-by-step plans to solve problems
4. Performing root cause analysis to identify underlying causes of problems and identify solutions
5. Evaluating potential solutions and selecting the most feasible
6. Implementing solutions to resolve problems
7. Assessing effectiveness of problem resolutions to contribute to continuous improvement activities
8. Documenting problems, approaches, steps taken, techniques applied and outcomes of the problem-solving activities to update knowledge bases

Knowledge and understanding requirements

1. What is meant by problem-solving
2. The importance of problem solving within an organisational context
3. How to diagnose problems to understand the main characteristics, impact, stakeholders and importance
4. Industry standard tools and techniques that can be applied to solving problems and how to apply them
5. How to plan problem solving steps
6. Steps involved in root cause analysis and how to apply them
7. How to evaluate solutions to problems and select the most appropriate
8. How to assess the effectiveness of problem-solving techniques and problem solutions
9. Impact on organisations of poor problem solving
10. How to document problems, problem solving approaches and resolutions
11. The importance of maintaining a knowledge base of problems and their resolutions

Producing documentation to support organisational process delivery

Goal of work situations:

To produce and update documentation for colleagues, customers and users to support the delivery of organisational processes.

Brief outline:

This is about individuals assessing documentation requirements, including audience, type of documentation and structure and format required. This also includes creating documents and associated graphics, identifying sources of information to include, maintaining version and revision control and checking documents meet requirements.

Performance requirements

1. Assessing documentation requirements to plan documentation production
2. Selecting structure and format of documentation in line with organisational style guides
3. Identifying sources of information for documentation to meet organisational requirements
4. Producing and updating documentation in line with organisational procedures
5. Applying version and revision control to document production in line with organisational procedures
6. Creating relevant graphics and visualisations within documentation to aid interpretation and illustrate key concepts
7. Reviewing documentation with stakeholders to ensure requirements are met
8. Following procedures for documentation sign off and storage in line with organisational procedures

Knowledge and understanding requirements

1. Who the stakeholders are for documentation
2. Purpose of the documentation being created
3. How to review documentation requirements
4. Steps involved in planning document production
5. Organisational structure and format style guides for standard documents including detailed and summary reports, plans, guidelines, standard operating procedures and project documentation
6. Industry standard conventions of format, structure and layout in documents and how to select and apply them
7. How to identify, locate and utilise information to include in documentation
8. Organisational policies and regulations for data protection and copyright that apply to documentation production
9. Industry standard tools and techniques used for document production and how to apply them
10. How to produce documentation
11. How to apply version and revision control to document production
12. How to create graphics and visualisations in documentation
13. Organisational procedures for testing and quality checking documentation
14. Organisational procedures for document sign off, version control, storage and distribution

Goal of work situation:

To develop meta-skills and personal practice through self-evaluation, agreeing objectives, reflecting on practice, and actively learning to improve own performance in line with organisational requirements.

Brief outline:

This is about developing meta-skills and personal practice. This involves reflecting on and learning from practice; acting on feedback; agreeing and working towards own objectives for continuous personal and professional development. Individuals will be supported in their development, usually by their line manager.

Performance requirements

1. Identifying meta-skills and role specific skills regularly used in own work to assess strengths and improvement needs for personal and professional development
2. Discussing and agreeing SMART objectives for personal and professional development and to achieve business objectives
3. Discussing and agreeing appropriate development activities to improve own performance and to achieve business objectives
4. Completing development activities within agreed timescales to support and progress own performance
5. Acting on feedback to improve own performance and development
6. Reflecting on performance, meta-skills and specific skills developed in your role to identify and agree future development needs
7. Completing mandatory training in line with organisational requirements
8. Completing documentation required for personal and professional development in line with organisation policy and procedures

Knowledge and understanding requirements

1. The purpose and importance of meta-skills including their definitions and how they relate to own work
2. The importance of personal and professional development within own organisation and role
3. How to use reflective practice to identify gaps in role specific knowledge, skills and meta-skills
4. How to participate effectively in performance reviews
5. How to discuss and agree SMART objectives – Specific, Measurable, Achievable, Realistic, Time-bound
6. The importance of business and personal objectives in own development
7. Sources of up-to-date and appropriate information to support own development
8. The importance of maintaining well-being in own role and where to get support
9. How to use feedback to develop own skills and knowledge
10. Different learning models and styles and how to use these for own development

Defining requirements to support project delivery

Goal of work situation:

To identify, understand and define stakeholder requirements for own projects to support project delivery.

Brief outline:

This is about individuals assessing requirements for projects they are tasked with delivering, through engaging with stakeholders to understand project goals and outcomes required. This includes defining and documenting requirements, identifying risks, producing estimates, developing plans and providing progress updates.

Performance requirements

1. Scheduling and attending project requirements meetings with stakeholders to gather project requirements
2. Reviewing project requirement specifications, plans and stakeholder feedback to specify own project tasks, deliverables and timescales
3. Undertaking estimation of own tasks and deliverables in line with organisational procedures
4. Producing task breakdown and project schedules to plan own project activities
5. Identifying key risks to own project to develop a risk assessment
6. Producing progress updates of own tasks to inform project monitoring

Knowledge and understanding requirements

1. Who the internal or external stakeholders are for a project
2. How to schedule and conduct stakeholder requirements meetings
3. How to engage with stakeholders and tailor communication styles
4. How to identify project requirements with stakeholders
5. How to interpret project requirement specifications and plans
6. SMART objectives (Specific, Measurable, Achievable, Realistic and Timebound) and how to apply them
7. Understanding the organisation's approach to managing projects and how this aligns to industry standard approaches
8. Steps involved in producing estimates for own project tasks
9. How to produce task breakdowns and schedules of own tasks and deliverables
10. Steps involved in identifying and assessing risks to own project activities
11. How to track and report own effort and progress on project tasks and outputs delivered
12. How to provide updates on projects and deliverables
13. The importance of developing excellent relationships with colleagues and stakeholders to support own project delivery

Goal of work situation:

To apply industry best practice and organisational design processes to support the production of software design solutions in line with software requirement specifications.

Note: Individuals receive on-the-job training while working under close supervision as they gain experience, typically working on smaller tasks within larger projects.

Brief outline:

This is about individuals supporting design of software components to meet software requirement specifications. This involves interpreting software requirements to support development of user stories and developing outline design approaches. This also includes applying standard design patterns to solve design problems and creating prototypes to demonstrate the proposed design approach.

Performance requirements

1. Interpreting software requirements specifications to plan software design activities
2. Supporting development of detailed user stories to guide software design processes
3. Applying organisational design patterns and defined architectures to solve design problems
4. Supporting the creation of outline software designs to meet software requirements
5. Creating prototype designs of the expected user interface to deliver required functionality
6. Presenting detailed design options to stakeholders for approval
7. Supporting production of software design documents using industry standard methods to describe software designs

Knowledge and understanding requirements

1. The importance of reading and understanding software requirements specifications
2. Principles of software design methods and how to apply them
3. Steps involved in developing user stories and how to apply them
4. Industry standard software design modelling methods and how to apply them
5. How to evaluate different software design solution options to optimise design solutions
6. What user interaction is and how it impacts user interface design
7. Software user interface accessibility standards and how to apply them to software design activities
8. How to produce user interface prototypes in software design
9. Industry standard and organisational software design patterns and how to apply them
10. How to evaluate the performance of software designs
11. Organisational design documentation standards and how to follow them
12. Inputs and outputs required to meet software functionality requirements

13. How and who to present and communicate software design options to
14. The role and application of configuration management systems for storing and managing software design artifacts

Contributing to implementing software development methodologies

Goal of work situation:

To contribute to the implementation of the software development methodologies approved by an organisation to deliver software products and services.

Note: Individuals receive on-the-job training while working under close supervision as they gain experience, typically working on smaller tasks within larger projects.

Brief outline:

This is about individuals adopting an organisation's selected software development methodologies, tools and techniques to support software development activities. This involves applying the structured processes for developers to work together efficiently as a team using a common approach in line with organisational procedures, and contributing to estimation, configuration management, progress review and documentation activities.

Performance requirements

1. Contributing to producing software development activity estimations to support software development planning in line with organisational development methodologies
2. Applying approved tools and techniques appropriate to software methodology to deliver software solutions in line with organisational requirements
3. Contributing to maintaining software development artefact versions in approved configuration management repositories to organise software products
4. Contributing to software development review meetings in line with the adopted methodology to update progress
5. Contributing to the preparation of software development methodology process documentation in line with organisational standards

Knowledge and understanding requirements

1. Industry standard software development methodologies including how waterfall, rapid application, agile, and DevOps work in practice
2. How to correctly estimate tasks to inform software development planning
3. Software development tools used to support different methodologies and how to apply them
4. Organisational standards that define how software development should be carried out and how to apply them
5. Benefits of adopting software development methodologies used to guide development activities
6. Why a specified development method and associated tools are used by the development team instead of alternative approaches
7. The scope and domain of the software products being developed
8. Industry standard tools and techniques used to support implementing software development methodologies and how to apply them, including Integrated Development Environment (IDE), version control, code quality evaluation, and configuration management
9. Industry standard process models including sequential, iterative, and incremental, and how to apply them

10. How software development methodologies align to team structure, project requirements, goals, budget, and other underlying factors
11. The importance of maintaining software process methodology documentation for software development projects
12. Different types of process documents required and how to prepare them

Goal of work situation:

To contribute to planning, creating and documenting well-defined software components to deliver agreed software requirements to stakeholders.

Note: Individuals receive on-the-job training while working under close supervision as they gain experience, typically working on smaller tasks within larger projects.

Brief outline:

This is about individuals coding, verifying, testing documenting, amending, and refactoring software using agreed standards and tools, to achieve a well-engineered result. Individuals will be involved in collaborating with others to support software development and review activities.

Performance requirements

1. Reviewing software requirements to plan required software solution activities in line with organisational procedures
2. Supporting planning software development contributions to align with development team project requirements
3. Developing new software code in line with organisational standards, plans and software requirements
4. Commenting on software to improve review and maintainability
5. Supporting connection of software to specified data sources to meet software processing requirements
6. Implementing software changes to meet new software requirements
7. Supporting software refactoring and updating to improve software performance and maintainability
8. Debugging and troubleshooting software artefacts to resolve defects
9. Preparing test cases to assure that software functions correctly and requirements are met
10. Writing and running unit test scripts to validate software artefacts
11. Supporting production of technical documentation, release notes and bug fix documentation in line with organisational standards
12. Supporting production of user documentation to guide use of developed software solutions
13. Presenting software solutions to users, team members and other stakeholders to demonstrate developed functionality and support user acceptance testing

Knowledge and understanding requirements

1. Agreed software requirements and how to interpret them to guide development activities
2. How to estimate and plan software solution activities in line with organisation standards
3. Industry standard software development environments and tools and how to apply them for different programming languages
4. How to develop software for web, mobile and fixed platform infrastructures
5. Principles of UX/UI (user research and user interface design) to software development screen layout
6. How to debug software to remove errors
7. Steps involved in test driven development and how to apply them
8. How to write test cases and apply them to software development quality assurance
9. Why software maintainability and refactoring are important for software sustainability
10. How to implement unit testing at each stage of software development to verify that software delivers required functionality
11. The role and importance of user acceptance testing to sign off software solutions
12. Industry standard software languages and how to develop software using

them

13. The need to consider accessibility standards when developing user interfaces
14. How to share knowledge across software development teams to improve efficiency
15. How to interpret data flow and entity relationship diagrams to develop required information processing
16. How to implement API's (application programming interfaces) and establish data source connections
17. The coding standards specific to the organisation and the importance of using them
18. Application of version revision control for software development
19. How to produce technical software documentation and user guides

Providing support for deployed software solutions

Goal of work situation:

To provide guidance and support to users and stakeholders on newly developed and deployed software solutions.

Note: Individuals receive on-the-job training while working under close supervision as they gain experience, typically working on smaller tasks within larger projects.

Brief outline:

This is about providing a customer-facing service to support users operating newly developed software applications, websites and mobile applications. This involves helping users overcome issues, identifying and recording bugs in software, providing workarounds and performing root cause analysis to resolve them.

Performance requirements

1. Responding to user problems with deployed software solutions (remotely or face to face) to identify user issues
2. Evaluating user issues to classify them as software defects, requests for new features or user errors
3. Triaging software issues to plan and prioritise support actions
4. Identifying software version and release updates to determine bug fix schedules and inform users
5. Communicating with users to advise them of the problem resolution and fixes, provide workarounds and user assistance
6. Documenting verified software bugs via defect management systems in line with organisational standards
7. Undertaking root cause analysis to reproduce software bugs to in order to identify appropriate solutions
8. Fixing software bugs and testing the solution to resolve software issues
9. Documenting steps taken to resolve bugs and issues in line with organisational procedures
10. Responding to user issues and providing updates and resolutions in line with service level agreements (SLAs)

Knowledge and understanding requirements

1. What is meant by deployed software support and how this different from general IT support
2. Differences between software defects (bugs), enhancement requests for new features, or user errors
3. Organisational software defect management processes and how to apply them
4. Industry standard tools used to handle defect reporting and management and how to use them
5. Change management processes used to support software enhancement requests
6. How to provide remote support to users to address software defects, workarounds and to resolve user errors
7. The importance of version control and release management in software updates
8. Approved collaborative support platforms and tools used by organisations for supporting deployed software applications
9. Distinction between the root cause of software defects and their effects
10. How to apply problem solving approaches to resolve software issues
11. Sources of knowledge to inform software issue resolutions

12. Service level agreements (SLAs) for responding to and resolving defects
13. The importance of documenting defects, workarounds and user guidance
14. Legal requirements related to provision of software application support
15. Value of maintaining strong rapport to maintain customer relations
16. That customers feel more confident and trusting when interacting with employees who take ownership and work with them to resolve their issues

Contributing to deploying software solutions

Goal of work situation:

To contribute to building and releasing new software to customer environments following organisational deployment processes required to make new software versions available to the intended users.

Note: Individuals receive on-the-job training while working under close supervision as they gain experience, typically working on smaller tasks within larger projects.

Brief outline:

This is about contributing to the processes through which new software applications or revisions are assembled, delivered and installed from software developers to users. It involves undertaking software build, release management and software installation using configuration management and version control systems and processes. It also involves creating software release documentation.

Performance requirements

1. Identifying requirements for software build and release in line with software deployment plans
2. Identifying source code configuration items to include in the software build for deployment
3. Contributing to merging software code versions using revision control software to produce the required software configuration
4. Contributing to building software releases ready for deployment in line with organisational procedures
5. Deploying software to build test environments for final quality assurance approvals in line with organisational procedures
6. Contributing to deploying software releases to customer environments in line with organisational procedures
7. Contributing to scripting activities to automate software deployment and installation processes
8. Documenting deployment activities to provide accurate release notes to support customers and users

Knowledge and understanding requirements

1. Steps involved in deploying software
2. Organisational software build and release processes and how to implement them
3. How to configure and build software releases
4. How to deploy software releases into customer environments
5. Industry standard configuration management, version control and build and release management software tools and how to apply them
6. Organisational software branch merging policies and how to implement them
7. Steps involved in automating software build and release management processes
8. Industry standard scripting tools used to automate software build and deployment and how to apply them
9. Steps involved in documenting software deployment processes
10. How to create release notes for software applications and updates
11. The importance of developing good relationships with customers to improve software deployment and handover

The relationship between meta-skills and work situations

Work situation	Meta skills alignment											
	Adapting	Collaborating	Communicating	Creativity	Critical thinking	Curiosity	Feeling	Focussing	Initiative	Integrity	Leading	Sense making
Applying problem solving approaches	✓		✓	✓	✓	✓	✓		✓	✓		✓
Producing documentation to support organisational process delivery	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
Developing meta-skills and personal practice	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Defining requirements to support project delivery	✓	✓	✓		✓	✓	✓	✓		✓		✓
Supporting software design	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Contributing to implementing software development methodologies	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Supporting software solution development	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Providing support for deployed software solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Contributing to deploying software solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

The table above indicates where there are opportunities to develop and evidence meta-skills in each work situation within the occupation profile. Please note, this information is for guidance, and indicates where meta-skills are explicit rather than an exhaustive list. There may be opportunities for individuals to develop and evidence other meta-skills when carrying out their role.

The relationship between National Occupational Standards and work situations

The table below indicates where there are links between National Occupational Standards and each work situation within the occupation profile

Work situation	National Occupational Standards Alignment
Applying problem solving approaches	ESKITP7034 Problem Management TECHDUPS1 Recognise and resolve routine digital technology problems
Producing documentation to support organisational process delivery	ECHDUWP1 Create and edit digital documents
Developing meta-skills and personal practice	CFABAA626 Plan how to manage and improve own performance in a business environment
Defining requirements to support project delivery	TECDT20341 Undertake system requirements elicitation and definition TECDT20351 Manage system requirements engineering
Supporting software design	ESKITP4073 Systems Design ESKITP4053 ESKITP4062 Human Computer Interaction / Interface (HCI) Design
Contributing to implementing software development methodologies	ESKITP5013 Carry out IT systems development under direction TECIT50731 Implement DevOps digital delivery infrastructure processes
Supporting software solution development	ESKITP5023 Software Development TECIT50831 Implement user centred development TECIS503302 Test software products
Providing support for deployed software solutions	ESKITP7043 IT Application Management / Support
Contributing to deploying software solutions	ESKITP5053 IT/technology systems installation, implementation and handover Level 3 Role