SQA Advanced Unit Specification

General information

Unit title: Web Development: Dynamically Generated Content (SCQF level 8)

Unit code: HP2T 48

Superclass: CB

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Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to enable learners to gain knowledge and skills of dynamic data driven web application development and apply that knowledge when planning, designing and developing a dynamic web application with data driven content using a server side language.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Explain dynamic data driven web development.
2 Plan and design a dynamic data driven website.
3 Implement a dynamic data driven website.
4 Test and deploy a dynamic data driven website.

Credit points and level

2 SQA Credits at SCQF level 8: (16 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Access to this Unit will be at the discretion of the centre and the following recommendations are for guidance only. Learners should have the knowledge and skills to produce a standards compliant static website using a mark-up language and stylesheets. This may be evidenced by the possession of the SQA Advanced Unit *Web Development: Essential Content* (HT05 47).

Core Skills

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill Problem Solving at SCQF level 6

Core Skill component None

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website **(http://www.sqa.org.uk/sqa/46233.2769.html)**.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain dynamic data driven web development.

Knowledge and/or Skills

- Types of Application
- Languages
- Development Server Configurations
- Frameworks/Integrated Development Environments(IDE)
- Databases
- Basic Cyber Security

Outcome 2

Plan and design a dynamic data driven website.

Knowledge and/or Skills

- Requirements document
- Site structure and page layouts
- Data source

Outcome 3

Implement a dynamic data driven website.

Knowledge and/or Skills

- Server Side coding
- Data Source
- Database Interrogation
- Security Features
- Session Management

Outcome 4

Test and deploy a dynamic data driven website.

Knowledge and/or Skills

- Test
- Deploy

Evidence Requirements for this Unit

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes.

The evidence for this Unit may be written or oral or a combination of these. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats and the use of multimedia.

The Evidence Requirements for this Unit will take two forms:

1 Evidence of cognitive competence (Knowledge and Understanding) for Outcome 1.
2 Evidence of practical competence (practical abilities) for Outcomes 2, 3 and 4.

To achieve Outcome 1 the candidate will need to demonstrate that they will be able to:

- identify and explain the types of dynamic data driven web applications
- identify and explain current server side languages. The candidate should state any requirements for using the language and recognise any distinguishing features of the language
- identify and explain current web development server configurations
- identify and explain the use of Frameworks and Integrated Development Environments for web development
- identify and explain current databases used to develop data driven websites
- identify and explain basic cyber security issues and how they can be deployed for web pages

For the practical competence in Outcomes 2, 3 and 4 the candidate will need to plan, design, implement, test and deploy a dynamic data driven web application based on a given brief. The candidate will be required to provide evidence to demonstrate that they will be able to:

- Analyse a client brief, prepare a requirements document, plan and design a site structure and page layout, implement a suitable data source for a dynamic data driven web application, including:
  - plan and design a dynamic data web application by producing a site specification, a site structure and page content summaries
  - implement an appropriate data source

- Develop a dynamic data driven web application utilising a server side language and a data source, including:
  - implement a suitable data store/database/data source with multiple tables
  - connect to a data source
  - develop the structure and content of a dynamic data driven website
  - develop web applications
  - use a server side language to facilitate database interrogation
  - use a server side language to implement security features
  - use a server side language to pass and obtain data from forms
  - use a server side language to pass and obtain data via the URL
  - use a server side language to implement SQL queries
  - use a server side language to implement session management
- Test and deploy a valid dynamic web application, including:
  - produce and implement a test strategy and plan which covers all web application functionality
  - explain the preparation requirements and deployment of a dynamic data driven website

The candidate should be provided with a realistic brief which is sufficient enough to allow the candidate to plan, design, implement, test and deploy a dynamic data driven web application and covers all Evidence Requirements for Outcomes 2, 3 and 4.

The holistic assessment that integrates assessments for Outcomes 2, 3, and 4 could take the form of a web application development project. The assessment should be carried out over an extended period.

Evidence of practical competence may be produced over an extended period of time. Evidence may be wholly or partly produced under controlled conditions. When evidence is produced in uncontrolled or loosely controlled conditions it must be authenticated. The *Guidelines on Approaches to Assessment* (see the Support Notes section of this specification) *provides* further advice on methods of authentication.

The *Guidelines on Approaches to Assessment* (see the Support Notes section of this specification) provides specific examples of instruments of assessment.

Unit Support Notes

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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

This Unit has been written in order to allow learners to develop knowledge, understanding and skills of dynamic data driven web application development and apply that knowledge when planning, designing and developing a dynamic web application with data driven content using a server side language.

Outcome 1 is designed to give the learners knowledge of the types of web applications, various development languages, server configurations, databases and development environments that can be used for developing dynamic data driven web applications

The following information is current at the time of writing.

The list that is deemed important material to cover in this Outcome is:

(a) Secure applications, eg login and user authentication, Ecommerce applications, eg product catalogues, shopping carts, back-end applications, eg product maintenance, report applications and Community applications, eg content management system, web forums, blogs.
(b) PHP, ASP.NET, Ruby on Rails, ColdFusion, JSP, CGI, Perl, Python or any other current language.
(c) Windows, Linux, Unix, IIS, Apache, Mac OS X server, ColdFusion or any other typical and current server.
(d) Ruby on Rails, Microsoft Web Platform, MVC, ZEND Framework, etc.
(e) mySQL, SQL Server, Oracle, MS Access, document orientated databases such as MongoDB, CouchDB which do not require SQL, etc.
(f) Basic security features when connecting to a database and using a form field to collect search criteria from users (sanitising form data, secure logins and authentication, session management, etc).

Outcome 2 is intended to give the learner Knowledge and/or Skills to plan and design a dynamic data driven website. This Outcome does not focus on the visual design, but rather the functional design so that the learner considers all technical and functional requests from the client. The data given to the learner should be in a format that can easily be converted into a suitable data source.

Outcome 3 is intended to give the learner skills to develop a dynamic data driven web site that involves web applications utilising a server side language and a data source. The centre may choose to deliver this Unit using any appropriate server side language and the language and programming concepts should be introduced from the beginning. A framework or IDE may be used for development, but the learner must also be able to write raw code in the language that the centre has chosen to use for delivery of this Unit. The language should be taught to a level that enables the learner to implement at least the following:

- Connect to a data source
- Develop a dynamic web application
- Facilitate database interrogation — create, read, update, delete
- Security features such as logins, user authentication
- Pass and obtain data from forms
- Pass and obtain data via the url
- SQL queries — search and results, filters, sorts
- Session management

The learner should be able to implement various web applications and integrate them into a website.

Outcome 4 intended to give the learners the knowledge and skills to be able to test and deploy a valid dynamic data driven website. The website should be tested for all functionality and errors logged and remedied where necessary. It is not necessary for the learner to actually upload the website due to possible cost implications for hosting of a data driven site, however if the facilities for this are available it would be an advantage. However the learner should know how to prepare the site for deployment and the how to find a suitable host that will support the technologies they have used.

Guidance on approaches to delivery of this Unit

The purpose of this Unit is to develop the learners' skills so that they can produce a valid dynamic data driven website within the 80 hours of the Unit.

In the delivery, learners should have access to the centres chosen server side language facilities, propriety web development software, basic text editor for writing source code and internet access.

During the holistic project that covers the assessment for Outcomes 2, 3, and 4 the learner must plan, design, implement and test in the correct order.

A suggested delivery sequence to this Unit would be the following:

- Outcome 1 should be taught and assessed first so the learner has the underpinning knowledge required for the remainder of the Unit.
- Outcomes 3 will take the largest amount of time to deliver and should be started early on in the Unit.
- Outcome 2 can be delivered at any appropriate time.
- Outcome 4 is probably best delivered when the learner has the skills to build a complete dynamic data driven website.

Outcome 1 assessment may be issued early on in the delivery of the Unit. The assessment should be conducted under closed-book conditions and as such learners must not be allowed any text books, handouts, Internet access or notes in the assessment. This assessment should be completed within one hour.

Outcomes 2, 3, and 4 may be assessed using a holistic assessment in the form of a project that integrates each of these Outcomes. This assessment requires that the learner be given a client brief. The brief should be detailed enough that the finished product meets the project brief and all the Evidence Requirements of Outcomes 2, 3, and 4.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to candidates.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where candidates experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Evidence is required that candidates have achieved all Outcomes.

Candidates are encouraged to use the internet in any research, etc however the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of candidate's evidence.

Outcome 1

Evidence for all Knowledge and Skills in this Outcome will be assessed using a representative sample of twenty questions. The assessment will be supervised, controlled and under closed-book conditions and should last no more than 1 hour. The instrument of assessment must provide opportunities for the Outcome to be fulfilled by means of sampling across the range of the content of Outcome 1. This assessment must change on each assessment occasion. Achievement can be decided by use of a 60% cut-off score.

Outcomes 2, 3 and 4

The candidate may be given the text, images, any other media and the data required in this web application as the aim of this Unit is to give the candidate knowledge and skills to plan, design and implement a dynamic web application with data driven content using a server side language.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

There are opportunities to develop the Core Skills of *Communication* (Written Communication) (Writing), Written Communication (Reading) at SCQF level 5 in this Unit.

This Unit has the Core Skill of Problem Solving embedded in it, so when learners achieve this Unit their Core Skills profile will be updated to show that they have achieved Problem Solving at SCQF level 6.

History of changes to Unit

Version	Description of change	Date

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

General information for learners

Unit title: Web Development: Dynamically Generated Content (SCQF level 8)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit is designed to teach you the underpinning knowledge required for dynamic data driven web application development and then gives you the opportunity to apply that knowledge when planning, designing and developing a dynamic web application with data driven content using a server side language.

You will learn about the types of web applications, various development languages, server configurations, databases and development environments that can be used for developing dynamic data driven web applications.

You will learn how to plan and design a dynamic data driven website.

You will learn how to develop a dynamic data driven web site that involves web applications using a server side language and a data source. The server side language may be one of PHP, ASP, ASP.NET, ColdFusion or JSP. You will be introduced to development through a framework or Integrated Development Environment as well as writing raw code. The IDE could be one of Visual Web Developer Studio or Dreamweaver/ColdFusion.

Finally you will learn how to test and deploy a valid dynamic data driven website.

There will be two assessments in this Unit. Outcome 1 may be assessed using a set of questions which need to be answered in class, under closed-book, supervised conditions. This assessment requires you to have an understanding of dynamic data driven web development and will include topics like Application Languages, Development Server Configurations, Frameworks/Integrated Development Environments (IDE), Databases and Cyber Security. It will probably take about an hour to complete.

The other assessment will be a project in which you are required to actually plan, design, implement, test and deploy a dynamic data driven web application.

There are opportunities to develop the Core Skills of *Communication* (Written Communication) (Writing), Written Communication (Reading) at SCQF level 5 in this Unit.

This Unit has the Core Skill of Problem Solving embedded in it, so when you achieve this Unit your Core Skills profile will be updated to show that you have achieved Problem Solving at SCQF level 6.