National Unit Specification

General information

Unit title: Computing: Interactive Multimedia (SCQF level 5)

Unit code: HW51 45

Superclass: CB

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Source: Scottish Qualifications Authority

Version: 1

Unit purpose

The purpose of this unit is to allow learners to develop knowledge and skills in interactive websites using client-side scripting languages. This unit is suitable for all learners. No previous experience is required, although it would be beneficial if learners possessed some basic knowledge of web authoring and programming skills.

Learners will gain knowledge and experience of linking client-side scripting files to a website. The advantages and disadvantages of client-side scripting language are explored, as well as the associated usability issues. Although the focus is on practical skills, learners will also acquire essential underpinning knowledge. The unit also aims to develop learners' skills in writing code to make use of the features provided by a client-side library.

On completion of this unit, learners will be competent in implementing client-side scripting to add interactivity to a website. They may want to broaden their knowledge by completing HW52 45 *Computing: Website Design and Development*. Learners could progress to the National Progression Award in Software Development (GLW4 46) at SCQF level 6.

Outcomes

On successful completion of the unit, the learner will be able to:

1 Link an external client-side script to a web page to meet the requirements of a specified brief.
2 Write code to add interactivity to a website for a specified brief.

National Unit Specification: General information (cont)

Unit title: Computing: Interactive Multimedia (SCQF level 5)

Credit points and level

1 National Unit credit at SCQF level 5: (6 SCQF credit points at SCQF level 5).

Recommended entry to the unit

While entry is at the discretion of the centre, it would be beneficial for learners to possess basic web authoring and programming skills before commencing with this unit. This may be evidenced by possession of Computing Science (C716 74) at SCQF level 4 (or equivalent).

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this unit specification.

There is no automatic certification of Core Skills or Core Skill components in this unit.

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.

This unit is part of the National Progression Award in Web Design at SCQF level 5. As such, it may be delivered alongside other component units such as HW52 45 *Computing: Website Design and Development* and H614 45 *Computing: Website Graphics*. In this circumstance, teaching, learning and assessment may be integrated across the units. Further details are provided in the support notes.

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**.

National Unit Specification: Statement of standards

Unit title: Computing: Interactive Multimedia (SCQF level 5)

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.

Outcome 1

Link an external client-side script to a web page to meet the requirements of a specified brief.

Performance criteria

(a) Explain the advantages and disadvantages of using a client-side framework for the specified brief.
(b) Identify usability issues associated with client-side scripting for the specified brief.
(c) Identify the correct location within the HTML file to link a client-side script.
(d) Write correct mark-up language to embed a client-side script to meet the requirements of the brief.
(e) Adhere to current web design standards.

Outcome 2

Write code to add interactivity to a website for a specified brief.

Performance criteria

(a) Describe possible solutions to usability issues associated with using client-side scripting for the specified brief.
(b) Add interactive elements to a website to meet the requirements of the brief.
(c) Write code using a client-side language for the specified brief.
(d) Test code to meet the requirements of the brief.
(e) Debug computer-programming code to ensure functionality.
(f) Adhere to current web design standards.

Evidence requirements for this unit

Evidence is required to demonstrate that learners have achieved all outcomes and performance criteria. A holistic approach is encouraged when assessing Outcomes 1 and 2. However, assessing the outcomes separately is acceptable.

The evidence requirements for this unit will consist of two types of evidence: knowledge evidence and product evidence.

The knowledge evidence will relate to all outcomes and performance criteria. It may take any appropriate format (including oral). The evidence will relate to explicit knowledge (such as Outcome 1, Performance Criterion (a)) and underpinning knowledge (such as Outcome 2, Performance Criterion (b)). The focus of the knowledge evidence is breadth, not depth, so the amount of evidence should be the minimum consistent with the performance criteria. It may be produced with access to reference materials over the life of the unit.

National Unit Specification: Statement of standards

Unit title: Computing: Interactive Multimedia (SCQF level 5)

Sampling of knowledge is permissible in certain contexts, such as when traditional testing is used to generate the evidence. When sampling is used, the sampling frame must be broad enough to ensure that every outcome is covered (but not every performance criterion in every outcome). In this circumstance, the test must be carried out under controlled, supervised and timed conditions, without access to reference materials.

The product evidence will take the form of **at least one** website that incorporates the use of client-side programming code to add interactivity. All the performance criteria must be satisfied using one website, tested on **at least two** different web browsers. Learners must produce the work on their own, but they are not required to build a website to implement their client-side script on; this will be provided by the assessor.

The finished website must satisfy the brief and its production must adhere to web design standards. It may be produced under loosely controlled conditions and may be created over an extended period of time. For example, some parts of it may be carried out without supervision from an assessor. In this scenario, authentication will be required to ensure that the product is the work of the learner.

Product evidence is required to demonstrate that the learner has satisfied the specified brief:

- Link an external client-side script to a web page.
- Write programming code using a client-side language to add interactivity to a website.
- Add at least two interactive elements to a website.
- Place all client-side code in an external file.
- Test and evaluate programming code to ensure it is compatible with at least two different web browsers.

The Assessment Support Pack (ASP) for this unit provides sample assessment material including an instrument of assessment for the knowledge and a specified brief. Centres wishing to develop their own assessments should refer to the assessment support pack to ensure a comparable standard.

National Unit Support Notes

Unit title: Computing: Interactive Multimedia (SCQF level 5)

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 40 hours.

Guidance on the content and context for this unit

The overall aim of this unit is to provide learners with the knowledge and skills needed to extend a non-interactive website, by using a client-side language, to add interactivity. The interactivity must be written using client-side scripting. It is acceptable for learners to incorporate new HTML and CSS into the website to aid their client-side scripting.

Please note that the following guidance is not a teaching syllabus and does not seek to explain each performance criterion, which is left to the professionalism of the teacher. This section seeks to clarify the statement of standards where it is potentially ambiguous. It also focuses on non-apparent teaching and learning issues that may be over-looked, or not emphasised, during unit delivery. As such, it is not representative of the actual time spent teaching or learning specific competences or the relative importance of each competence.

If this unit is delivered as part of the National Progression Award in Web Design at SCQF level 5, there is significant potential for teaching, learning and assessment to be integrated across the component units.

Outcome 1

This outcome focuses on ensuring learners follow, and adhere to, current web design standards and consider the associated usability issues.

Typical theory should include the following:

- Client-side frameworks, such as jQuery and MooTools
- HTML structure
- Placing of client-side scripting, ie inside the *head* section of the HTML file using <script> tags
- Linking external files to a web page, eg linking a file to *head* section of HTML using 'src' attribute
- Ensuring the written client-side code is external to the HTML files
- Advantages of having client-side code external to the HTML files, such as:
  - It separates HTML and code
  - It makes HTML and JavaScript easier to read and maintain
  - Cached JavaScript files can speed up page loads

National Unit Support Notes (cont)

Unit title: Computing: Interactive Multimedia (SCQF level 5)

Outcome 2

This outcome focuses on ensuring the learners' interactive websites remain compatible on devices with and without scripting enabled.

Typical theory should include the following:

- Compatibility of interactive elements to ensure functionality of website in devices with scripting enabled or disabled. For example, if the interactive element is something like a JavaScript drop-down menu, the menu would still have to be fully functional on devices that do not have scripting enabled.
- Use of <script> and <noscript> tags
- Usability issues, such as:
  - Client-side script used purely for navigation causes issues on handheld devices
  - Code containing overuse of loops and events causes poor browser performance
  - Inflated client-side script causes website to take a long time to load
- Interactive elements. The interactive elements can vary in difficulty, thus allowing for differentiation. Some elements would include, but are not limited to:
  - Roll-over event
  - Drop-down/fly-out menu
  - Photo gallery
  - News ticker
  - Form validation
  - Alert box
  - Playback controls for an embedded video file
  - Digital clock
  - Sound
- Cross-browser compatibility, ensuring client-side code is:
  - Valid
  - Error free
  - Conforming to current standards

Guidance on approaches to delivery of this unit

This unit should be delivered by a computing specialist, who is a competent programmer, with a good understanding of current web design standards.

It is recommended that the unit is delivered in the sequence of the outcomes, since each outcome requires the underpinning knowledge and skills of the earlier outcome. Learners will require access to web development software or an advanced text editor, and at least two web browsers.

Learners would benefit from being introduced to current web design standards and the usability issues associated with using client-side scripting. It is expected that learners will undertake their own investigatory work before engaging in professional dialogue with the assessor regarding the advantages and disadvantages of client-side frameworks.

There will be an opportunity for collaborative working in this unit for Outcome 2. Learners could work alongside each other to gain experience of what it would be like to work in the web design industry. Although collaboration with other learners taking the unit is encouraged, each learner must be able to provide their own evidence.

National Unit Support Notes (cont)

Unit title: Computing: Interactive Multimedia (SCQF level 5)

What assessors need to cover when delivering Outcome 1:

- Advantages and disadvantages of using a client-side framework
- HTML structure
- How to link external files to a web page

What assessors need to cover when delivering Outcome 2:

- Usability issues associated with using client-side scripting
- Implementation of a client-side language or framework
- Testing and debugging computer-programing code

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 learners.

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

A traditional approach to assessment would comprise a test (for knowledge evidence) and a practical assignment (for the product evidence).

The knowledge assessment should take place towards the end of unit. The test could consist of a number of selected response questions, chosen from all of the outcomes and performance criteria. Not every performance criterion should be tested but every outcome could be tested by a number of questions. For example, a multiple-choice test, consisting of 25 items, each with four options, could be used. In this case, the pass mark would be 15 out of 25. The test would be timed and carried out under controlled conditions, without access to reference material. Where re-assessment is required it should contain a significantly different sample selected from the range of mandatory content.

The practical assignment should be assessed using a holistic approach where learners are given a single brief covering both outcomes. The assessment brief should not be complex. The brief should require learners to research the use of client-side scripting languages and implement two interactive elements into a pre-built website. It is not acceptable to have one interactive element on two separate websites, although the interactive content could be on separate web pages belonging to the same website. The pre-built website should only contain HTML and CSS, and not any client-side code.

The finished product should include two interactive elements (both can be added to the same web page), which have been selected and tested for compatibility issues, and added to a pre-built website by the learner. It may be constructed under loosely controlled conditions. For example, parts of it may not be done under the supervision of the assessor. In this scenario, authentication would be required, which could take the form of oral questioning or professional dialogue with the learner. Alternatively, an assessor observation checklist could be used for authentication purposes to ensure that the learner has completed the tasks along with the product evidence. The assessor should endorse each learner checklist with their name, signature and date.

If the learner chose to use a client-side framework, such as jQuery or MooTools, then they would be required to link that and the client-side file inside the *head* section of the website. However, if they chose not to use a client-side framework, they would only be required to link to one client-side file. With regard to the interactive elements, at this level it is acceptable for learners to implement pre-written client-side plugins available within most client-side frameworks. Examples of these can be found at **https://mootools.net/forge/browse**.

A more contemporary (and natural) approach to assessment would be the use of a web log (blog) to record learning over the life of the unit. The blog could log, on a regular basis, learner activities, which would include their research, writing of code and final-product work. Given the multimedia nature of blogs, individual posts could record the tasks carried out by learners, including linking the client-side script to an external file, illustrating the various stages of them carrying out the supplied brief. Resources permitting, the blog should include a link to the finished website.

The resulting website should be assessed against defined criteria and these criteria should be known to the learner before they submit their evidence. The criteria should be based on the performance criteria within this unit specification and the characteristics defined in the evidence requirements section of this unit specification together with the appropriate SCQF level descriptors.

Formative assessment could be used to assess learners' knowledge at various stages in the unit. An ideal time to gauge their knowledge would be at the end of each outcome. This assessment could be delivered through an item bank of selected response questions, providing diagnostic feedback to learners (when appropriate).

If the unit is being delivered as part of the National Progression Award in Web Design at SCQF level 5, then it may be an advantage to learners if the assessment of this unit is combined with the assessment of other component units of this award.

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

This unit will provide opportunities for learners to develop Core Skills in *Communication* (SCQF level 5) through oral questions and professional dialogue, when explaining usability issues and client-side frameworks to the assessor. Opportunities are also provided for developing the Core Skill of *Numeracy* due to the mathematical nature of client-side scripting.

National Unit Support Notes (cont)

Unit title: Computing: Interactive Multimedia (SCQF level 5)

Other Core Skills that may be developed throughout this unit are: *Problem Solving* (SCQF level 5), *Information and Communication Technology* (SCQF level 5) and *Working with Others* (SCQF level 4).

Moreover, the above Core Skills will enhance the employability of learners undertaking this unit, in a range of capacities with and out with the software development and web design industries.

History of changes to unit

Version	Description of change	Date

General information for learners

Unit title: Computing: Interactive Multimedia (SCQF level 5)

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 aimed at learners who can build websites using HTML and CSS. It is suitable for you if you are comfortable coding non-interactive websites, and want to progress to learning how to add interactivity using client-side coding.

You will be introduced to the key skills required to implement client-side scripting to further extend websites, including learning about client-side frameworks.

This unit will further prepare you for a career in web design by requiring you to research the usability issues web designers face when trying to bring a website to life, using client-side scripting. You will develop essential computer programming skills in this unit.

This unit will be assessed using a practical assignment. You will also be required to provide evidence of your knowledge of client-side frameworks and technical terminology. You may produce this throughout the unit or at the end of unit delivery; your teacher/lecturer will decide this.

On completion of this unit, you will be able to:

- research and identify the range of client-side options available at your disposal.
- identify and solve any usability issues relating to the implementation of client-side scripting.
- write HTML code to link client-side code to a website.
- write client-side code to add interactivity to a website.
- test computer-programming code in a variety of web browsers.

Throughout the unit you will have opportunities to develop the following Core Skills:

- *Communication*: This skill will be developed during discussions with your assessor(s) throughout both outcomes, regarding choices you make regarding frameworks and usability issues.
- *Numeracy*: Throughout Outcome 2 this skill will naturally develop by using client-side scripting, which will require calculations involving browser sizes, x & y co-ordinates, timers, etc.
- *Problem Solving*: The programming required for Outcome 2 will contribute to develop this skill.
- *ICT*: It is likely that you will encounter programming problems when working through the outcomes in this unit. Due to the open-book nature of the assessments, and the expectation that you will try and problem-solve yourself, you could be allowed to use the internet to search for solutions to your problems.
- *Working with Others*: There is an opportunity for you to work with someone else, should your assessor allow you to, during Outcome 2. This is a valuable skill that will prepare you for working in the web design and software development industries.