National Unit Specification

General information

Unit title: Computer Games: Development (SCQF level 6)

Unit code: HX9X 46

Superclass: CB

Publication date: February 2018

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

The purpose of this unit is to allow learners to gain complex knowledge and acquire skills in developing a computer game using coding. It is an introductory unit suitable for all learners. No prior knowledge or experience is required.

This is a **non-specialist** unit, intended for a wide range of learners who may continue into further study of computer games or pursue a career in the computer games industry.

The unit covers the following knowledge and skills:

- Constructing a working computer game using a computer programming language
- Importing the media assets
- Following a design to create a working game
- Evaluating and testing the completed game

On completion of this unit, learners will be able to implement the design for a working computer game and evaluate the effectiveness of the final solution produced.

On completion of this unit, learners may wish to deepen their knowledge of computer games development by progressing onto the NC in Computer Games Development.

Outcomes

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

1 Create a working computer game.
2 Test the computer game.
3 Evaluate a computer game.

National Unit Specification: General information (cont)

Unit title: Computer Games: Development (SCQF level 6)

Credit points and level

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

Recommended entry to the unit

While entry is at the discretion of the centre, learners should possess basic digital literacy skills.

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 Computer Games Development at SCQF level 6. As such, it may be delivered alongside other component units such as HX9V 46 *Computer Games: Design* and HX9W 46 *Computer Games: Media Assets*. 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

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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 performance criteria 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

Create a working computer game.

Performance criteria

(a) Construct a working game based on a given game design document, using coding
(b) Correctly add media assets as specified in the game design document
(c) Use variables appropriately
(d) Use common code constructs
(e) Use internal documentation appropriately

Outcome 2

Test the computer game.

Performance criteria

(a) Identify potential test strategies for testing a computer game
(b) Devise a test strategy for testing the computer game
(c) Test the computer game using the test strategy devised
(d) Identify and log errors
(e) Rectify major errors

Outcome 3

Evaluate a computer game.

Performance criteria

(a) Evaluate how a completed game matches or differs from the game design document
(b) Justify any differences between the game design document and the completed game
(c) Produce a review of a game, including a rating system, comparing the game to another of the same genre

Evidence requirements for this unit

Evidence is required to demonstrate that learners have achieved all outcomes and performance criteria. Learners will need to provide evidence to demonstrate their knowledge and/or skills across all outcomes.

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

National Unit Specification: Statement of standards

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The **knowledge** evidence will relate to all outcomes and performance criteria. It may take any appropriate format (including oral). The evidence will relate to underpinning knowledge (such as Outcome 1, Performance Criterion (a)). 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.

The **product** evidence for this unit will take the form of a **digital or paper portfolio.** The portfolio must include the following:

- A working computer game based on a given game design document
- A list of media assets added to the game
- A code listing, highlighting the following:
  - Use of variables
  - Use of common code constructs
  - Use of internal documentation/comments
- A description of **at least three** different test strategies appropriate to computer game testing, including the testing strategy to be used in testing the game
- A test document containing:
  - A list of the tests carried out
  - The results of testing
  - A log of errors
  - Rectifications made due to testing
- Written evidence for:
  - Evaluating how well the computer game matches or differs from the design document
  - Justifying any differences between the game and the design document
- A computer game review that includes:
  - Reviews of **at least four** of the following design features:
    - Narrative/objective design
    - Character design
    - Level/environment design
    - Game mechanics/gameplay design
    - User interface design
  - A rating system that rates **at least three** aspects of the game
  - An evaluative comparison of the game with another of the same genre

The **product** evidence must be produced under supervised, open book, loosely controlled conditions and may be conducted 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.

The SCQF level (Level 6) of this unit provides additional context on the nature of the required evidence and the associated standards. The SCQF level descriptors (**http://scqf.org.uk/wp-content/uploads/2014/03/SCQF-Level-Descriptors-WEB-Aug-2015.pdf**) should be used (explicitly or implicitly) when making judgements about the evidence.

When evidence is produced in uncontrolled or loosely controlled conditions it must be authenticated. The *Guide to Assessment* provides further advice on methods of authentication (**https://www.sqa.org.uk/files_ccc/Guide_To_Assessment.pdf**).

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

National Unit Support Notes

Unit title: Computer Games: Development (SCQF level 6)

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

Please note that the following guidance, relating to specific outcomes, does not seek to explain each performance criterion, which is left to the professionalism of the teacher. It 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 relative importance of each outcome or performance criterion.

Outcome 1

Learners must construct a computer game based on a pre-made design. It is expected that learners who are completing the NPA Computer Games Development will follow a game design document that they have created themselves; however, this does not need to be the case. Learners who do not have a suitable game design document of their own may be given one by their assessor.

Given the complexity of developing a computer game, it would be acceptable for learners to follow a series of tutorials to develop a prototype game, and then to demonstrate their ability to modify the game to suit the original design. Advice on what constitutes a suitable computer game at this level is given below.

At this level, a feasible game would be a two-player bat and ball game such as Pong, but with some additional features. This game has each player controlling the vertical movement of bats at each side of the screen. A ball is hit back and forth between the players' bats and if the ball hits the wall behind a player, then that player loses. The game is played over a number of rounds, with a scoreboard displaying the status of the wins/losses. At specific intervals in the game, a 'power up' appears in the middle of the playing area. If the 'power up' is hit by the ball, then the power up takes effect. For example, it may change the bat size or change the speed of the ball movement. Such a game might feature only six media assets — a bat, a ball, a 'hit' sound, a power up object, a scoreboard, and a message indicating the winner/game over.

Another feasible game would be a 'catch' game, with the player moving a character left and right across the bottom of the screen and catching objects that periodically fall from the top of the screen. Points are scored by catching the objects, and a score is displayed in a scoreboard. The game is time-limited, with a timer displaying how many seconds are left before the game ends. A secondary object also falls periodically from the top of the screen and this is a 'power up'. The power up, if caught by the player has an effect on the gameplay, such as multiplying the score or speeding up the player movement. This game might feature six media assets — the player character, the falling object, a power up, a 'catch' sound, a scoreboard, and a timer.

National Unit Support Notes (cont)

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A third feasible game would be a platformer or maze game, with the player controlling a character that must activate switches to exit the level. The challenge is locating the switches and exit, whilst trying to avoid multiple enemies that track the player around the maze. The game is time-limited, with a timer displaying how many seconds are left before the game ends. This could feature as little as six media assets — the character, the maze walls/platforms, the enemy, the switches, a switch activation sound, and the timer.

The computer game must be constructed with a focus on coding. Some game development tools (eg, Gamemaker, Unity and Stencyl) provide the possibility of constructing more complex interactions through scripts, and coded in a variety of programming languages. It would not be acceptable to use a block-coding environment such as that offered by Scratch or App Inventor; learners must type code and learn the rigours of producing syntactically correct code.

Assessors may also consider programming environments to create games, or use game development frameworks. Suitable tools include Greenfoot (Java), Phaser (HTML5/Javascript framework), Pygame (Python framework), Monogame (C# and .NET), and others.

Learners must demonstrate the ability to use variables and programming constructs in their code. Programming constructs include functions/methods, parameter passing, selection (eg, IF statements), and repetition (eg, loops). There is no requirement for learners to demonstrate all of these, as some games may not require them.

Learners must incorporate media assets in their game. These assets may include graphics and sound, and also text objects, such as scoreboards or information. Graphical assets may be 2D or 3D, still or animated, as dictated by the game development tool.

Outcome 2

Learners must test their games, ensuring no major errors exist. Learners must be able to describe at least three different testing strategies, such as functional, white box, black box, prototyping, critical path testing, etc. Learners must choose a suitable testing strategy for their own game.

Given the complexity of computer game development, it may be difficult to ensure that all errors are rectified, so it would be acceptable for learners to rectify major errors, and to log details of any errors or ‘glitches’ that may be too complex to resolve at this level.

Outcome 3

The evaluation of the final game should seek to match the game with the features identified in the game design document. The final game should broadly match the original design, but differences are allowable. For example, a game design document might indicate that a game should contain three levels, but the learner, given time constraints, may have been able to implement only two levels. Any differences should be reported and justification for the changes should be explained.

At this level, learners should be able to express how much a game does or does not match the original design, and provide detailed justifications for the differences.

National Unit Support Notes (cont)

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Learners must also produce a review of a game. Ideally, learners in a group would review each other's games, rather than reviewing their own game. Learners should access professional game reviews to familiarise themselves with the structure and language used in reviews. A rating system must be developed that could be reasonably used to compare games. Professional game reviews often use rating systems for different features of a game, such as graphics, storyline, playability, repeatability, enjoyment, sound, engagement, etc. Some game types may have very specific review criteria. For example, an educational game may be judged on the quality of its content and educational value.

The review must compare two games of the same genre, so it would be acceptable for learners to produce a comparative review of games produced by their peers. If a peer-produced game is unavailable, then a commercial game may be used for the comparison.

Guidance on approaches to delivery of this unit

If this unit is undertaken in the context of the NPA in Computer Games Development at SCQF level 6, the following sequence of delivery is recommended:

- *Computer Games: Design*
- *Computer Games: Media Assets*
- *Computer Games: Development*

A suggested distribution of time, across the outcomes, is:

Outcome 1: 24 hours
Outcome 2: 8 hours
Outcome 3: 8 hours

Summative assessment may be carried out at any time. However, when testing is used (see evidence requirements) it is recommended that this is carried out towards the end of the unit (but with sufficient time for remediation and re-assessment). When continuous assessment is used (such as the use of a web log), this could commence early in the life of the unit and be carried out throughout the life of the unit.

There are opportunities to carry out formative assessment at various stages in the unit. For example, formative assessment could be carried out on the completion of each outcome to ensure that learners have grasped the knowledge contained within it. This would provide assessors with an opportunity to diagnose misconceptions, and intervene to remedy them before progressing to the next outcome.

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.

National Unit Support Notes (cont)

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There are ample opportunities for delivering this unit in groups and in a vocational context. Learners could already have formed groups (companies) to design a game and produce media assets for it. It would then be natural for them to all contribute to the development of the actual game. It is understood that this might be more difficult to achieve and to still be able to clearly demonstrate the contribution of each learner in the process. One approach might be that they each contribute a distinct level for the game or that they each produce their own version of the game. These approaches could allow them to evaluate each other's efforts, although it is suggested that they are allowed to evaluate the development of another game entirely. It is essential that each learner identifies their own contribution to the task if working in a group and that they provide evidence for their own portfolio.

Formative assessment could be used to assess learners' knowledge at various stages throughout the life of 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.

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

In this unit, learners are required to create a computer game which can provide opportunities to gather evidence towards aspects of *Information and Communication Technology* and *Problem Solving* at SCQF level 6.

This unit may be delivered in the context of a larger game with learners developing a level (or logical part) of a computer game. This would provide opportunities to gather evidence towards aspects of *Working with Others* at SCQF level 6.

History of changes to unit

Version	Description of change	Date

General information for learners

Unit title: Computer Games: Development (SCQF level 6)

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.

The aim of this unit is for you to gain skills in developing a computer game. You will learn how to create a game using coding, and will customise the game to match a pre-made design.

The unit covers the following knowledge and skills:

- Constructing a working computer game using a computer programming language
- Importing the media assets
- Following a design to create a working game
- Testing the completed game
- Evaluating a completed game

On successful completion of this unit, you will be able to develop simple computer games using a game development tool or coding, and to test and evaluate that game.

You will be assessed by written or oral reports, and by undertaking a project to create and evaluate a computer game.