Unit 14: Computer Games Development

Delivery guidance

Approaching the unit

The purpose of this unit is to provide learners with practical experience of designing and developing computer games. Learners will spend time investigating the computer games industry before assuming the role of a software developer within the games industry and analysing popular genres to design and develop their own computer games.

Learners should have access to adequate game development environments (such as those stated in the unit specification) in order to complete the assessments for this unit. Preferably, they should have access to a selection of environments, as this will enable greater opportunity for comparison with development options.

This delivery guide does not cover everything that needs to be delivered for completion of this unit but gives examples of delivery methods. You should refer to the specification for full details of all the content that needs to be covered.

Delivering the learning aims

For learning aim A, you could begin by discussing computer gaming in general. Learners could talk about their favourite computer games and genres. You should be careful here as there is potential for learners to get carried away with talking about their favourite games. To this end, try to focus learners on why particular games are their favourites. What makes them come back to these games? This could lead to discussions about different kinds of player, which could include age range, gender or casual versus immersive gamers, for example. At this point, you could also discuss the different ways of producing games, for example mainstream publishers, indies or free-to-play.

After discussing games and genres, move on to how games are played. Do learners prefer multiplayer or single-player games? Discuss multiplayer systems and the way they are implemented and maintained. Talk about how this leads to distribution platforms and integrated services, such as Steam and Google® Play Also, discuss concerns relating to multiplayer platforms such as how they can be kept secure. Initiate discussion about the way in which single-player games are implemented. Talk about how developers create convincing artificial intelligence.

Learners should investigate the hardware and software technologies available for use in computer games and what difference they can make to their design, development and distribution. Explain the benefits and limitations of different platform options for the development of computer games. Learners should discuss what effect new technologies have on the computer games people play and how this affects the design and development of these games. Discuss the uses of game engines and their capabilities and the way in which they help computer game developers.

If possible, invite guest speakers from game developer studios to convey the current state of development processes and emerging areas. This should help highlight the need to keep up to date with technology.

In learning aim B, learners design a computer game. As with any software design, they should be familiar with the scope of the design. You should guide learners in the process of choosing appropriate models to use in their designs. Learners should be familiar with techniques used in game design and be confident in the application of the ones that they will use in their own designs.

Throughout this learning aim and learning aim C, impress upon learners the stages of software development, including analysis, design (in learning aim B), and development and testing (in learning aim C). Ensure that learners understand what is required in the analysis and design of a computer game, and in the management of a software development project. You could encourage them to apply the project management skills that they acquired in *Unit 3: Planning and Management of Computing Projects* to their projects.

Set aside time for learners to review their designs with their peers and, if possible, practitioners. They could do this through presentations or seminars, where they could ask questions and make suggestions for improvement.

In learning aim C, give learners as much practical experience as possible. Introduce the use of development environments early on and allow learners time to experiment with the tools available. Ensure that you give learners the opportunity to develop their skills using their chosen environment so that they can make use of the advanced features listed in the unit specification.

In learning aim C, learners will complete their development projects. You should ensure that they are proficient with the development and testing stages of software development.

Allow time for learners to review their own draft computer games and those of their peers. Try to do this late enough that the learners have working games, but early enough that they will have time to make refinements based on the feedback they receive.

Throughout their practical work, learners should be encouraged to keep a diary in which they can keep a record of their progress, any issues they encountered and how they overcame them. This will be valuable when writing the evaluation and reflecting on their own performance as part of the second assignment.

High-quality, accurate communication skills in written and verbal forms are vital for progression into higher education and in employment. As such, learners should be confident in presenting thoughts and ideas to others, as well as producing well-presented, accurate and appropriate documentation for all stages of a project. Learners must be able to effectively evaluate the success of a project and the factors that contributed to the final outcome, including their own skills, knowledge and behaviours.

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Learning aim	Key content areas	Recommended assessment approach
A Investigate technologies used in computer gaming	**A1** Social trends in computer gaming **A2** Technologies used in computer gaming	A report investigating and evaluating social and technological trends in gaming and how they would influence the development of new computer games.
B Design a computer game to meet client requirements	**B1** Computer games design processes and techniques **B2** Design documentation **B3** Reviewing and refining designs	A design specification showing the design and development of a computer game to meet identified client requirements. Project brief, design documentation, development and testing logs, meeting notes and a report that evaluates the effectiveness and appropriateness of the computer game. The evidence should also suggest ways in which solutions could be improved and/or alternative solutions that could be used if the task were to be repeated.
C Develop a computer game to meet client requirements	**C1** Principles of computer games development **C2** Developing computer games **C3** Testing computer games **C4** Reviewing computer games **C5** Quality characteristics **C6** Skills, knowledge and behaviours	

Assessment guidance

This is an internally assessed unit. The recommended assessment approach is for two assignments.

Assignment 1 should cover learning aim A. The assignment should analyse computer games, and the trends and technologies that exist within the industry. It should also discuss emerging trends and technologies, for example the developments in wearable technologies, and their impact on computer games development. The assignment could be delivered as a website as part of an ezine. A blog or some form of audio or visual evidence would also be acceptable and would allow learners to develop their creativity, provided the information is communicated in a clear and detailed manner using appropriate language.

Assignment 2 covers learning aims B and C. This assignment should be project-based, where learners design and develop their own computer game. Learners should try to use different assets (graphic, audio, animation etc.) in the development of their game. Encourage them to use assets developed in other units, where possible. Learners should deliver the assignment as a functional computer game with an associated development report.

Getting started

This gives you a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.

Unit 14: Computer Games Development

Introduction

Computer games now cover personal computers, consoles, mobile devices such as handheld consoles, phones, tablets and wearable technologies. With the spread of devices available for use, the computer games industry is continually growing and, as such, many computer game developments are as large a production as blockbuster movies, involving many contributors.

As game developers, learners will need to meet client requirements and understand the limitations and potential of different gaming solutions.

Learning aim A – Investigate technologies used in computer gaming

- In learning aim A, learners will investigate computer games, genres and the technologies available to computer game developers. Learners should be equipped with a range of skills and knowledge before starting the assignment – do not use the assignment as a vehicle to teach the content.
- As learners consider and discuss games, they may start talking about gaming platforms, leading to the popular argument about which platform is best. Try to familiarise yourself with the arguments, so that you can dispel prevailing myths about specific platforms or technologies. Learners could also discuss their expectations of future gaming technologies such as the Xbox One S (released in August 2016), Xbox Scorpio, the PS4 Neo and new developments around the Sony PlayStation VR (released in October 2016).
- As learners discuss games and technologies, you can introduce technologies used in the development of computer games. Learners need to gain knowledge and understanding about the hardware and software options available to game developers.
- If possible, demonstrate some game development technologies with the use of some games in class (whether on PC, console or mobile device). At this stage, it would be useful for learners to see the process of designing and developing a simple game.
- Work with learners to develop their analytical and evaluative skills. Explore different areas of development (e.g. specific consoles, devices or genres of game) and give learners opportunities to consider the requirements of each one.
- Ensure that learners understand how to produce the detail required to achieve the highest grade bands in the assessment.

Learning aim B – Design a computer game to meet client requirements

When delivering learning aim B, you could refer to the popular genres and technologies identified in learning aim A, to help investigate how popular games were designed and how technology was employed. Learners should be equipped with a range of skills and knowledge before starting the assignment – do not use the assignment as a vehicle to teach the content.

- You should guide learners in the process of choosing appropriate models to use in their designs. Learners should be familiar with techniques used in game design and confident in applying the ones that they will use in their own designs.

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- In groups, learners could build on earlier discussions to consider the type of games they would like to design. Whether learners do the design work individually or in groups, they will gain useful insight from group discussions.
- Learners must be familiar with software development and the design documentation that is expected of them. They must be able to design the visuals, story, gameplay and algorithms for their game. To this end, they should be confident in the use of storyboards, diagramming techniques and pseudocode.
- Learners should review their designs with their peers and refine as necessary. Learners could present their design concepts for their computer games to the class and ask for comments and suggestions for improvement. They should make a note of any useful feedback given along with details of any refinements required.

Learning aim C – Develop a computer game to meet client requirements

In learning aim C, learners develop their computer game from the designs created in learning aim B.

- Learners must know how to develop software from a design schematic, which should include how to apply graphical rendering and vectoring or add physics to their virtual environments. Learners should be able to produce a prototype of their games using appropriate tools and techniques. They should be able to use several game development environments, so that they can build up their skills.
- Learners should be confident in the use of game engines to develop visual styles. They should be able to optimise for certain input methods, integrate assets and include advanced features such as artificial intelligence, 3D rendering and multiplayer capabilities in their designs.
- Learners should be able to test their computer game for functionality, playability, compatibility and stability. These tests should employ a variety of methods, including white box and black box methodologies. Any issues should be rectified.
- Learners should demonstrate their games to an audience and gather feedback from sample players to identify areas needing improvement and the overall level of acceptance and playability.
- It will benefit learners if they maintain a diary or take notes as they complete the various practical activities in the lessons relating to this learning aim. They should also note the comments that their peers make when they act as users of the system.
- Having completed the process of development, learners should reflect on their performance. They should evaluate their computer game and their own approach to the project.
- It will benefit learners if they maintain a diary or take notes as they complete the various practical activities in the lessons relating to this learning aim. They should also note the comments that their peers make when they give feedback.
- Ensure that learners understand how to fulfil the assessment criteria for the pass, merit and distinction grades.

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

Pearson BTEC Level 3 Nationals in Computing (NQF):

- *Unit 3: Planning and Management of Computing Projects*
- *Unit 10: Human–Computer Interaction*
- *Unit 11: Digital Graphics and Animation*
- *Unit 12: Digital Audio*
- *Unit 13: Digital Video*
- *Unit 16: Object-oriented Programming*
- *Unit 18: Relational Database Development*
- *Unit 22: Systems Analysis and Design*
- *Unit 24: Software Development.*

Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this unit of the BTEC Nationals in Computing. Check the Pearson website (http://qualifications.pearson.com/en/support/published-resources.html) for more information as titles achieve endorsement.

Websites

- www.html5gamedevelopment.com/html5-game-tutorials
  Tutorials for game development in HTML5.
- https://unity3d.com/learn/tutorials
  Tutorials for Unity game engine.
- https://wiki.unrealengine.com/Videos
  Video tutorials for Unreal Engine technology.
- http://sandbox.yoyogames.com/make/tutorials
  YoYo tutorials for game development in Game Maker.

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