Unit 76: Flash for Computer Games

Unit code: J/600/6637

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The aim of this unit is to develop learners' understanding of the use of Flash in computer games, and the skills needed to use Flash in the construction of games and ActionScript in game programming.

Unit introduction

Flash as a game development platform for casual games is an authoring tool which has grown considerably in power over the years. Flash can be used to create games as simple as noughts and crosses or as complicated as a real-time multiplayer game. Flash simplifies the visual side of programming computer games, works on almost every computer, and has a powerful and reasonably straightforward ActionScript programming language. Flash is a very good environment for learning basic game programming ideas.

Programming is what makes games interactive. The ActionScript language built into Flash lets the developer do anything that can be done with animation and many things that cannot be done by using animation techniques alone.

In this unit learners will examine what goes on behind the scenes of a Flash game and how ActionScript is used to create and control objects directly rather than relying only on the Flash environment to control objects via animation. Learners will investigate how Flash is used in the creation of an interactive game. They will understand how Flash can control game physics and be used to develop 2D and 3D isometric games for mobile devices and the web. Learners will use Flash tools and ActionScript to create a game.

Learning outcomes

On completion of this unit a learner should:

1   Understand the application of Flash to game development

2   Be able to use Flash tools for game construction

3   Be able to use ActionScript for game programming

4   Be able to make a Flash game following industry practice.

Unit content

1 Understand the application of Flash to game development

Flash for game development: Flash's integrated development environment (IDE); Flash Player

Game programming in Flash: advantages for game programming; ActionScript compared to animation; limitations of Flash; plug-ins; Flash variants and players, eg Flash Lite; coding conventions (file naming, camel case, punctuation, indentation); PC platforms (Flash); mobile platforms (Flash Lite)

Making games: making artificial worlds; importance of interactivity; objects; programmer as 'hidden' player

Planning Flash games: story; input devices; graphics; sound; importance of gameplay; game plan (main character, look and feel, game screens, screen objects, role of objects, behaviour of objects); game flowcharts

2 Be able to use Flash tools for game construction

Flash environment: workspace (stage, timeline, toolbar and panels, preferences, help)

Basic tools: drawing, eg pencil, line, pen, brush, shapes; free transform, eg rotate, skew, distort, scale, envelope, ruler and guidelines; editing, eg lasso, eraser, undo, copy, paste, duplicate, insert, delete, aligning, grouping, ungrouping

Objects: symbols, eg instances, duplicating symbols, swapping symbols, editing, grouping; buttons (creation, library, button states, code)

Colour tools: colour, eg colour properties, eyedropper, creating custom colours, colour swatches, stroke and fill

Text tools: eg editing, moving, rotating, reshaping, scrolling, creating text blocks, converting text to shapes

Animation: timeline (playhead, layers, frames, frame label, frame rate, keyframes, onion skinning, markers); frame manipulation, eg copying, deleting, reversal; testing movies; frame-by-frame animation; tweening (shape, motion)

Assets: importing, eg raster images, vector images, sound files, video files, movie clips; resizing; asset libraries

Advanced tools: scenes; guide layers; masking, eg mask layers, animated masks; timeline effects, eg blur, drop shadow, expand, explode, transform, transition; nesting movie clips; interactivity, eg scripting, behaviours, actions, triggers, buttons, rollovers, playback control, preloaders

Saving and exporting: saving; publishing; optimising; file formats; reasons for formats

3 Be able to use ActionScript for game programming

Basic: object-oriented programming, eg class, class definition, instances, properties and methods; syntax; pseudocode; testing; bugs; crashes

Text: static; dynamic; input; associating variables; reading input

Random numbers: math objects; dice

Decision making: conditions; false conditions; 'else' clause

Repeated behaviours: loops; arrays

Advanced: events; sprites; movie clips; objects, eg properties, functions, characteristics, dx and dy properties, onEnterFrame events; game boundary checking; cursor substitution; mouse tracking; artificial intelligence (AI); scorekeeping (text fields, winning and losing states); audio output; animated sprites, eg computer control, direction constants, turning, moving; user-controlled sprites, eg keyboard input, checking for motion keys; collision testing, eg checkCollisions() function

Vectors: eg vector conversion, vector projection in motion, centre of gravity, vector paths, calculating vectors (dx, dy, angle, length)

Game physics: eg velocity, acceleration, calculating distance, vectors, compensating for gravity, random integers, Newton's laws, objects in motion, traction

4 Be able to make a Flash game following industry practice

Game design: planning considerations, eg genre, interpreting creative brief, storyboarding, asset management

Asset preparation: graphical (sprites, backgrounds); behavioural (effects, objects, ActionScripts); sound, eg effects, music, ambience, dialogue; file types, eg bmp, gif, tiff, jpg, wav, midi, aiff, au, smp, mp3, ra, vox

Production: assets; ActionScripts; animation; game world; testing (alpha, beta, user testing)

Publishing: executables, eg PC platforms (Flash), mobile platforms (Flash Lite), internet

Industry practice: reflect on finished product (compared with original intentions, fitness for purpose, technical qualities, aesthetic qualities); production skills (ideas generation, game design documentation, workflow and time management, technical competence, teamwork)

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 describe the application of Flash to game development with some appropriate use of subject terminology [IE]	**M1** explain the application of Flash to game development with reference to detailed illustrative examples and generally correct use of subject terminology	**D1** critically assess the application of Flash to game development with supporting arguments and elucidated examples, consistently using subject terminology correctly
P2 apply Flash tools for game construction working within appropriate conventions and with some assistance [CT]	**M2** apply Flash tools for game construction to a good technical standard showing some imagination and with only occasional assistance	**D2** apply Flash tools for game construction to a technical quality that reflects near-professional standards, showing creativity and flair and working independently to professional expectations
P3 apply ActionScript for game programming working within appropriate conventions and with some assistance [CT]	**M3** apply ActionScript for game programming to a good technical standard showing some imagination and with only occasional assistance	**D3** apply ActionScript for game programming to a technical quality that reflects near-professional standards, showing creativity and flair and working independently to professional expectations
P4 make a Flash game following industry practice, working within appropriate conventions and with some assistance. [CT; RL; SM]	**M4** make a Flash game to a good technical standard following industry practice, showing some imagination and with only occasional assistance.	**D4** make a Flash game to a technical quality that reflects near-professional standards following industry practice, showing creativity and flair and working independently to professional expectations.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key			
	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

It is suggested that teaching follows the order of the learning outcomes, starting with an introduction to the application of Flash to game development and following that with a study of Flash tools and ActionScript. Learners should be introduced to basic concepts of game physics and have opportunities to examine and practise how these concepts are implemented in ActionScript. Learners can then produce a game in Flash incorporating scripts for interactivity.

This unit could be taught through a variety of activities, such as lectures, group discussions, Flash gameplay, practical sessions and demonstrations. The largest proportion of time should be spent in practical sessions using Flash and especially ActionScript. Using Flash will demonstrate to learners how 2D sprites can be used to give an illusion of 3D and how scrolling backgrounds are used to give an illusion of animation or movement. Learners will be expected to have a good working knowledge of Flash to produce and test a playable game. This can be achieved through practical demonstrations and exercises.

Formal lectures and independent study will be the main methods used to develop understanding of the application of Flash. Learners will need access to Flash games (from websites, mobile devices or on disk) in order to study how Flash can be applied within the computer games industry. Learners should have the opportunity to study the use of Flash Lite for mobile games, since the mobile market is developing rapidly.

Learners must have access to Flash software to experience the use of Flash tools and the application of ActionScript to promote gameplay and interactivity. When providing Flash games for study, the.fla files should also be provided so that ActionScript commands and their effects can be studied.

Teaching of ActionScript is best done in short, carefully structured stages, each stage being reinforced with small practical projects which, when completed, allow progress to the next stages. Tutors should strive to build a progressive library of games with corresponding ActionScript so that early, simple examples of script can be built upon, leading to the development of more powerful and usable scripts for games.

The production of a Flash game should be viewed as an opportunity to put into practice the skills and knowledge learned throughout the unit and as the major piece of work for the unit. It is expected that learners follow good game design habits when producing their game. This is best achieved through learners planning their games on paper before using Flash. Learners should record their planning and developmental work, as this can be used as part of their reflective practice. Learners may require access to other software (for example, a graphics package in order to prepare suitable assets).

Reflective practice is an important part of games development and design. Learners should be encouraged to compare their completed game with their original intentions. This can be achieved through self-evaluation (using techniques such as peer and client testing) and recorded in a report.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way of planning the teaching and assessment of this unit.

Topics and suggested assignments and activities
Introduction to unit and unit assessment.
Introduction to the Flash IDE and Flash's usefulness in building games. Learners will: • attend lectures and tutor-led demonstrations explaining the Flash IDE and introducing Flash Player • attend lectures discussing advantages and disadvantages of Flash for game programming • attend lectures on important considerations when designing a game • attend lectures to explain elements to consider when planning a Flash game • conduct private study practising the planning of a Flash game by generating ideas for story, input devices, graphics, sound, gameplay, game plan (main character, look and feel, game screens, screen objects, role of objects, behaviour of objects), drawing game flowcharts.
Assignment 1 – Flash for Computer Games: What You Need to Know Learners will write an article for an online games ezine on using Flash to build computer games, its advantages and disadvantages.

Introduction to Flash interface and tools.
 	
Learners will:
 	
• attend lectures and complete directed practical work examining the graphics tools available in Flash:
 	
  ◊ Flash environment, basic tools and objects, saving
 	
  ◊ colour tools and text tools
 	
  ◊ animation and assets
 	
  ◊ advanced tools
 	
• conduct private study experimenting and developing skills in using Flash interface and graphical tools.

Introduction to ActionScript.
 	
Learners will:
 	
• attend lectures and complete directed practical work examining the ActionScript language available in Flash, especially scripts useful for game programming:
 	
  ◊ basic
 	
  ◊ text
 	
  ◊ random numbers
 	
  ◊ decision making
 	
  ◊ repeated behaviours
 	
  ◊ advanced: events, sprites, movie clips, objects
 	
  ◊ advanced: game boundary checking
 	
  ◊ advanced: cursor substitution and mouse tracking

◊ advanced: scorekeeping

◊ advanced: keyboard input

◊ advanced: animated sprites

◊ advanced: user-controlled sprites

◊ advanced: collision testing

◊ vectors and physics

- conduct private study experimenting and developing skills in using ActionScript.

Assignment 2 – My Flash Game

Learners receive a brief from a client to devise and make a playable demonstration of a web-based advergame to promote a specified product.

Learners will:

- prepare a portfolio in which they:

    ◊ generate a brief specification for a Flash game

    ◊ create or locate the sound, graphical and script assets for the game

    ◊ use the Flash interface to make a playable demonstration of their game specification

    ◊ publish the game as an executable file for PC, internet or mobile

    ◊ review their own work.

Unit learning and assessment review.

Assessment

Evidence for assessment

Evidence for achievement of learning outcome 1 of this unit can be drawn from presentations both written and oral. Oral presentations must be recorded for the purposes of internal and external verification. Learners may present researched information which could include extracts from books, journals, articles, material published on the internet or trade publications. Evidence relating to learning outcome 1 might also be presented in the form of wiki articles created by learners.

Evidence for achievement of learning outcomes 2 and 3 may be drawn from the final game produced as evidence for learning outcome 4, but in this case there must be additional supporting evidence explaining why tools have been chosen and how they have been used, and explaining in detail what ActionScript has been used and why. Checklists of available tools or scripts showing where they have been used are in themselves not sufficient to demonstrate achievement of learning outcomes 2 and 3; again, these must be supported by additional annotation explaining their use. Documentation could be presented as annotated screen grabs or via screen capture software with voiceover. Comprehensive, authenticated logs supported by other materials might be suitable alternative vehicles.

For some elements of this unit, and for some learners, a formal viva voce assessment might be appropriate. When more than one learner in a cohort is assessed in this way, care must be taken to ensure that all learners are asked equivalent questions, and that all are given equal opportunities to expand or clarify their answers. Interviewers must also ensure that questions are not phrased in such a way as to provide or suggest an answer. Formal vivas should be recorded for the purposes of internal and external verification and at least 50 per cent of such assessments must be internally verified.

Application of grading criteria

When applying the grading criteria, tutors should follow the advice given below. Please note that any examples of evidence given here are indicative only. This advice is not exhaustive and the examples need not specifically be included in a learner's work in order for that learner to achieve the exemplified grade.

Pass

To achieve a pass grade, learners must achieve all the criteria at pass level. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

P1: learners will describe the application of Flash to game development, including reference to Flash as an integrated development environment (IDE) and discussing advantages and limitations of Flash for game programming. Additionally, learners will describe the basics of making games and planning requirements for Flash games. Evidence will show a basic understanding of technical terminology but learners will generally be unsure about this vocabulary and will make fairly frequent mistakes when they do use it.

P2: learners will generate a Flash game which uses some of the key characteristics of the software in simple and conventional ways. Learners' use of the software tools will be basic and restricted to tools such as environment, drawing, text, colour, animation, saving and exporting. Learners will, as a minimum, have identified where tools have been used. This evidence could be presented via a document with screen grabs and annotation, or perhaps screen capture software with voiceover.

P3: learners will apply elementary ActionScripts which provide some player interactivity and control, and which enable a basic level of gameplay. Learners' application of ActionScript will be basic – for example, scripts to control animation, control movie clips, make user-controlled buttons, play sounds and identify keyboard input.

P4: learners will achieve a finished working game which is playable though limited and conventional. The final product will not realise learners' full intentions but work on the game will have been purposeful and the outcome will reflect some interpretation of the brief and some elementary planning of game design, and will evidence the deliberate application of Flash tools and ActionScript. Following industry practice, some attempt to reflect on the product will be made, moving some way beyond merely describing their work. Some user testing of the final product must be evidenced, typically by inclusion of user comments within reflective practice. Evaluative comments will be assertions that are not supported by evidence or exemplification.

P2, P3 and P4: learners at the pass grade may need frequent assistance and support, though they will take note of and make use of this help when it is given. If they are in frequent need of such help but fail to make positive use of it, they should not be considered for a pass grade for this unit.

Merit

To achieve a merit grade, learners must achieve all the pass and all the merit grade criteria. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

M1: learners will explain the application of Flash to game development, including reference to Flash as an integrated development environment (IDE) and explaining advantages and limitations of Flash for game programming. Additionally, learners will explain game design basics and planning requirements. All explanations will be supported by detailed illustrative examples. Learners will explain coding conventions and exemplify their explanation of game-making basics by reference to examples of Flash games. Learners will use technical vocabulary for the most part correctly, but may make mistakes or be unsure about usage at times.

M2: learners will generate a working Flash game which uses the software application tools competently and in an imaginative way, making use of conventions but not slavishly copying them and reflecting their understanding in the implementation of their ideas. Learners' use of the software tools will extend beyond the basic. They will identify where tools have been used and attempt to justify their selection. This evidence could

be presented via a document with screen grabs and annotation, or perhaps screen capture software with voiceover.

M3: learners will apply ActionScripts which competently provide player interactivity and control, enabling gameplay in an imaginative way, making use of conventions but not slavishly copying them, and reflecting their understanding in the implementation of their ideas. At this grade learners' application of ActionScript will extend beyond the basic – for example scripts to set and maintain player scores and scripts to detect and deal with collisions, perhaps implementing laws of motion or gravity effects. Learners will identify where scripts have been used and will attempt to justify their use. This evidence could be presented via a document with screen grabs and annotation, or perhaps screen capture software with voiceover.

M4: learners will generate a finished working Flash game which is playable and imaginative, showing some confidence in the application of skills. The final product will approach learners' full intentions and work on the game will reflect a methodical approach, some imagination in interpretation of the brief, some planning of the game design and production, and will evidence a competent application of Flash tools and ActionScript. There will be some evidence of testing during production. Following industry practice, a careful reflection on their product will be made, explaining choices and decisions and exemplifying these explanations through relevant reference to their own work. Some comments from others will be included in learners' reflective practice, including reference to test results.

M2, M3 and M4: learners will show facility and some confidence in relation to skills and the handling of software. Work will be approached methodically and with adequate preparation. Processes will be undertaken with care and, generally speaking, thought will be put into the work. Though learners might still be working within recognisable generic creative conventions, codes and conventions, whether aesthetic or technical, will not be slavishly copied but will be employed with some inventiveness. Learners at this grade might well need occasional support, particularly when trying to apply more sophisticated techniques or working in more difficult circumstances. As with the pass grade learner, they will make use of any support provided.

Distinction

To achieve a distinction grade, learners must achieve all the pass, all the merit and all the distinction grade criteria. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

D1: learners will fully explain the application of Flash to game development and address all points listed in the unit content. The evidence will be lucid, using explicit examples to provide support for points being made and their opinions. Learners will justify points made using supporting arguments or evidence, developing ideas critically (that is, comparing, assessing and discriminating). They will draw out of an example precisely what it is about it that that exemplifies the point it illustrates. Technical vocabulary will be secure and used correctly and confidently at all times.

D2: learners will generate a fully working original Flash game showing creativity and flair, drawing clearly on their interpretation of the brief and the ideas they have generated. At this grade learners will use the Flash application tools with confidence and autonomy to produce their game. Learners will fully document their use of the Flash tools used to produce their game. This evidence could be presented via a document with screen grabs and annotation, or perhaps screen capture software with voiceover.

D3: learners will generate and apply ActionScripts which provide more complex player interactivity and control, enabling gameplay in an imaginative way with some qualities of originality. At this grade learners' application of ActionScript will evidence technical excellence. Learners will fully document their use of the ActionScript used to produce their game. This evidence could be presented via a document with screen grabs and annotation, or perhaps screen capture software with voiceover.

D4: learners will produce a fully working original Flash game showing creativity and flair demonstrating full confidence in application of skills. The final product will meet and may exceed initial intentions and their work will be highly creative and of a quality approaching professional standards, showing technical excellence in

relation to skills. At this grade, learners' work will demonstrate care in design and planning for their game and evidence technical excellence in application of Flash tools and ActionScript. Learners will evidence thorough and systematic testing of their game throughout its development including alpha, beta and user testing. Following industry practice, learners will reflect accurately and critically on their own work with detailed reference to elucidated examples of that work. This reflection will consider comments from others gathered during testing.

D2, D3 and D4: technical and production skills will approach the professional standard and work produced will bear comparison with professional work. Distinction grade learners will apply their technical skills not just with imagination but with ingenuity and even elegance, and codes and conventions will be used with occasionally surprising results. In all practical activity they will be capable of working autonomously and effectively. The term 'working independently' should not be understood to mean producing poor quality work autonomously, nor the learners doing what they want, when they want, how they want. It means that they are able to work on their own initiative, do not need constant support or supervision, give the work their full commitment, work positively and cooperatively with others, and meet deadlines. In other words, they have the kind of self-management skills that would be expected of them in a professional context. Note also that this criterion should not be taken to mean that learners do not seek advice or that they work without discussing things with their tutor, but rather that they are not dependent upon the support of others and that when they take advice they weigh it carefully for themselves.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, M1, D1	Assignment 1 – Flash for Computer Games: What You Need to Know	Article for online games ezine on using Flash to build computer games.	- All preparatory notes. - Article as word processed or electronic document.
P2, M2, D2 P3, M3, D3 P4, M4, D4	Assignment 2 – My Flash Game	Brief from a client to devise and make a playable demonstration of a web-based advergame to promote a product.	- A concise design specification. - A file of assets (graphical, ActionScripts and sounds). - A concise production diary evidencing use of Flash tools and ActionScripts. - Final playable published game. - Brief reflective commentary.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Creative Media Production suite. This unit has particular links with the following units in the BTEC Creative Media Production suite:

Level 2	Level 3
2D Computer Game Engines	Computer Game Design
Computer Games Testing	Digital Graphics for Interactive Media
Digital Graphics for Interactive and Print-Based Media	Object-Oriented Design for Computer Games
	Sound for Computer Games
	Web Animation for Interactive Media

There are opportunities to relate the work done for this unit to Skillset National Occupational Standards in Interactive Media and Computer Games as follows:

- IM1   Work effectively in interactive media
- IM2   Obtain assets for use in interactive media products
- IM3   Prepare assets for use in interactive media products
- IM5   Design user interfaces for interactive media products
- IM6   Use authoring tools to create interactive media products
- IM7   Code scripts to provide functionality for interactive media products
- IM8   Determine the implementation of designs for interactive media products
- IM13   Conduct user testing of interactive media products
- IM20   Design electronic games
- IM22   Test electronic games
- IM24   Create 2D animations for interactive media products.

Essential resources

Learners will need access to appropriate hardware along with Adobe Flash software and any other relevant industrial-standard software. Learners should have access to relevant software manufacturers' manuals, textbooks, and a library of examples of current Flash Games and ActionScripts.

Employer engagement and vocational contexts

Centres should develop links with local game development studios which could be approached to provide visiting speakers, study visits or samples of typical interface layouts and documentation.

Skillset, the Sector Skills Council for the creative media sector, has a substantial section of its website dedicated to careers, including job descriptions – www.skillset.org/careers/.

Further general information on work-related learning can be found at the following websites:

- www.aimhighersw.ac.uk/wbl.htm – work-based learning guidance
- www.businesslink.gov.uk – local, regional business links
- www.nebpn.org – National Education and Business Partnership Network
- www.vocationallearning.org.uk – Learning and Skills Network
- www.warwick.ac.uk/wie/cei/ – Centre for Education and Industry, University of Warwick – work experience and workplace learning frameworks.

Indicative reading for learners

Textbooks

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Student Book* (Pearson, 2010) ISBN 978-1846906725

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Teaching Resource Pack* (Pearson, 2010) ISBN 978-1846907371

Adobe Creative Team – *Adobe Flash CS4 Professional Classroom in a Book* (Adobe, 2008) ISBN 978-0321573827

Besley K – *Flash MX 2004 Games Most Wanted* (APress, 2004) ISBN 978-1590592366

Green T and Chilcott J – *Macromedia Flash 8 Professional: Training from the Source* (Macromedia, 2005) ISBN 978-0321384034

Harris A – *Beginning Flash Game Programming for Dummies* (Wiley Publishing, 2006) ISBN 978-0764589621

Hoekman R – *Flash Out of the Box* (O'Reilly, 2004) ISBN 978-0596006914

Kerman P – *Sams Teach Yourself Macromedia Flash MX2004 in 24 Hours* (Sams, 2003) ISBN 978-0672325946

Makar J and Sosinksy B – *Macromedia Flash MX Game Design Demystified* (Macromedia, 2004) ISBN 978-0735713987

Moock C – *Essential ActionScript 2.0* (O'Reilly, 2004) ISBN 978-0596006525

Moock C – *Essential ActionScript 3.0* (O'Reilly, 2007) ISBN 978-0596526948

Peters K – *Foundation ActionScript Animation: Making Things Move!* (Friends of Ed, 2005) ISBN 978-1590595183

Rhodes G – *Macromedia Flash Professional 8 Game Development* (Charles River Media Game Development, 2006) ISBN 978-1584504870

Rosenzweig G – *Macromedia Flash MX ActionScript for Fun and Games* (Que, 2002) ISBN 978-0789727992

Ulrich K – *Macromedia Flash 8 for Windows and Macintosh: Visual QuickStart Guide* (Peachpit Press, 2006) ISBN 978-0321349637

Ulrich K – *Flash CS3 Professional for Windows and Macintosh: Visual QuickStart Guide* (Peachpit Press, 2007) ISBN 978-0321502919

Websites

www.adobe.com – the website of this software manufacturer contains useful information and resources, including training materials, forums, downloadable trial software and players, news etc

www.ferryhalim.com/orisinal – free Flash games resource

www.flashadvisor.com – Flash games resource, tutorials, animations, ActionScripts, Flash movies and sound loops

www.flash-game.net — a resources site with more than 3000 free games and online games including sports games, action games, puzzle games, Flash games and multiplayer games

www.flashkit.com – a resources site for Flash developers which includes reviews, sound loops and tutorials

www.flzone.net – tutorials from ActionScript to web design

www.tutorialized.com/tutorials/Flash/Games/1 – Flash games resource, tutorials, animations, ActionScripts

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	researching the Flash integrated development environment (IDE) and the features of Flash that make it suitable for building computer games, judging the value of the information found and using it to support their arguments carrying out research into purposes of using Flash for computer games carrying out research to develop ideas for their own Flash game
Creative thinkers	generating ideas for implementation using Flash tools, sourcing and adapting ActionScript code for use in their game and combining their ideas and sourced assets to make a new game trying out different tools and scripts to find better and effective ways of using them for building their Flash game adapting their code scripts as circumstances change
Reflective learners	reviewing and reflecting on their work in making a Flash game and acting on the outcomes to modify and improve their work setting goals with success criteria for their Flash game production work inviting feedback on their own use of Flash tools and ActionScript and dealing positively with praise, setbacks and criticism evaluating their learning and experience to inform future progress
Self-managers	organising their time and resources and prioritising their actions whilst generating ideas, and when creating their finished Flash game seeking out challenges or new responsibilities and showing flexibility when circumstances change while making their Flash game dealing with competing pressures, including personal and work-related demands while preparing work for assessment responding positively to change, seeking advice and support when needed during preparation of assignment work.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Team workers	if working in a group to produce a specification for a Flash game, taking responsibility for their own role managing their personal contribution to and acting upon information from others in discussions to reach agreements and achieve results when debating the use of Flash for computer games.

● Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	handling systems to use the Flash integrated development environment (IDE) and create their Flash game
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	planning for the production of a Flash game
Manage information storage to enable efficient retrieval	managing assets sourced and created for their Flash game
Follow and understand the need for safety and security practices	handling systems to create their Flash game
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	sourcing assets for their Flash game
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching asset types and their limitations for use with Flash tools
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	building and presenting their project portfolio showing their interpretation of the game specification and their generation of ideas
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	preparing a report on Flash for computer games and how Flash tools and ActionScript are used
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	gathering feedback on their Flash game creation work as part of their self-reflective practice

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	using estimation and calculation to plan stage layouts and calculate game physics effects
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	taking part in brainstorming sessions to generate ideas in response to a creative brief to make a Flash game
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	studying manufacturers' manuals and textbooks for Flash tools and ActionScript
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	creating their game portfolio incorporating ideas, notes, game documentation and reflective commentary.