

**Arrangements for:
HNC Computer Games Development**

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Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

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History of changes

It is anticipated that changes will take place during the life of the qualification, and this section will record these changes. This document is the latest version and incorporates the changes summarised below.

Version number	Description	Date	Authorised by

1 Introduction

This is the Arrangement document for the new Group Award in HNC Computer Games Development which was validated in June 2005. This document includes: background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

The computer games industry is now firmly established as a major feature of the UK's contemporary media landscape. Sales of entertainment software outstrip the video rental market and cinema box office spending, and the growth in the software and hardware market is set to go on rising. More games are being purchased worldwide and UK companies are contributing to that success.

The importance of the computer games development industry to the Scottish, UK, European and global economies is well recognised. According to the Entertainment and Leisure Software Publishers Association (ELSPA), the Computer Games industry's turnover worldwide was \$18.2 billion in 2003. In fact, 'the world market for games and edutainment software grew to \$18.2 billion in 2003, up from \$16.9 billion in 2002. It is predicted that by 2007, the global market will be worth \$21.1 billion. Within the UK, leisure software sales grew again in 2003 to reach £1.68 billion and we continue to have the third largest market in the world for games after the US and Japan, whilst remaining comfortably the largest market in Europe'. (www.dti.gov.uk/industries/computer_games).

This DTI study also states 'this is one of the most exciting and fast-growing sectors in the digital content industry. Recent figures from the Entertainment and Leisure Software Publishers Association (ELSPA) and Screen Digest show that games consoles are truly becoming mass market. From the end of 1995 to 2003, over 25 million dedicated gaming devices were sold in the UK. This is enough for every household in the land to have one. Globally, this rises to a staggering 350 million gaming devices'. (www.dti.gov.uk/industries/computer_games).

Scottish Enterprise states that 'Scotland's computer games industry has an estimated turnover of £20 million'. Scottish Enterprise also states it 'is investing up to £25 million in the development of Scotland's creative industries, to exploit the wealth of talent, skills and enterprise in the sector'. Scottish Enterprise has 'games' at the top of their 'creative industries list'. (www.scottish-enterprise.com)

The computer games industry is one of a number of 'creative industries' which play a major role in the Scottish and UK economies. 'Scotland is home to a community of highly successful games developers, employing over 500 people and generating £20 million annual turnover' (www.scottish-enterprise.com). 'The creative industries are forecast to grow on average by 10% per annum. For those companies involved in digital content production, rates up to 20% per annum are predicted' (ibid).

The Skillset Careers Website states that 'The computer games industry is now firmly established as a major feature of the UK's contemporary media landscape'.

'The video games industry employs over 20,000 people— in development, distribution, retail, printing and other support areas — making it by far the largest software employment field in Europe' (Source: Screen Digest).

2 Rationale for the development of the award

In order for the games industry to develop further it is recognised that there is a requirement for personnel with up to date and relevant skills in computer games development. Whilst there is provision of games development qualifications at degree and postgraduate level, there is currently no provision in Scotland at HN level. This HNC award in Computer Games Development, is designed to address this omission by providing the opportunity for people who do not possess the standard university entrance qualifications to gain a computer games development qualification and use this as a route to employment or degree level study.

Regarding the very real necessity for FE and HE computer games-related courses, it is noted that ‘demand comes from the large number of game developers, and companies faced with the continuing shortage of skilled staff. Skills gained on these courses are transferable to other technological areas, such as health and medicine (eg body, illness and drug action simulation), the military (strategic, battle and weapon simulation, without costly weapons or friendly-fire injuries), and business and management (economics and management simulations).’ (Source: John Kirriemuir, independent consultant in Digital Technologies, article available at www.freepint.com/issues/160502.htm)

The HNC Computer Games Development qualification aims to provide the necessary skills and depth of knowledge to ensure that candidates are well placed to enter the computer games industry (or general IT industry) at a junior level or to progress to further study.

The HNC Computer Games Development was designed by the staff of Stow College, Glasgow.

It is the Qualification Design Team’s (QDT) intention to develop an HND in Computer Games Development at a future date. This HNC in Computer Games Development is a first step towards this.

Stakeholder Consultation and Market Research

The QDT conducted market research to obtain an idea of what our current students, industry and universities were looking for from the course. A questionnaire was set up and sent to employers and the proposed framework for the HNC Computer Games Development was sent to universities. A student questionnaire was also composed and issued to all full time and part time (day) students within the Computing Department at Stow College as well as the Media Technology and NQ Music and Creative Industries students from the Music and Creative Industries Department, again at Stow College. Computing students from both Reid Kerr College and John Wheatley College were also surveyed.

Stakeholder Group	Market Research tool	Responses
Students	Student questionnaire	136
Employers	Employer questionnaire	45 contacted, 6 responses
Universities	Framework issued for consultation and discussion forum	3 (Paisley, Abertay, Glasgow Caledonian)
Industry bodies: <ul style="list-style-type: none"> ◆ E-Skills ◆ Skillset ◆ ELSPA (Entertainment and Leisure Software Publishers Association) ◆ ITI Techmedia ◆ IGDA (International Games Developers Association) ◆ TIGA (The Independent Games Developer Association) ◆ Learndirect ◆ Scottish Enterprise 	Discussion forum, course framework	All provided guidance in varying amounts

Student Responses to Key questions	
Interest in a Games Development Course	79% very interested
Delivery pattern	Majority of those asked preferred full time. Small minority for evening part time delivery as top up to existing awards
Most popular subject areas	3D Modelling Console Programming
Most popular games players	Playstation 2 X Box PC

Employer Responses to Key questions	
Specific skill requirement	Object Oriented Programming Computer Planning 3D Modelling Console Programming
Core Skills requirement	Maths for Games Programming
Computer Language used	Primarily C#, Java, C++ and C

Table 1: Stakeholders research

These results show that an overall percentage of 79% of the surveyed students would be very or possibly interested in undertaking this course. It also gives an indication of which subjects the students would be interested in achieving and the method of delivery that they prefer. These results also demonstrate which skills and languages are important to employers.

Articulation Discussions with Universities

The QDT held discussions with Glasgow Caledonian University, Abertay University and Paisley University regarding the framework for the course.

Glasgow Caledonian University has agreed to HNC Computer Games Development students gaining second year entry to their BSc Games Software Development course provided the students have the 15 credits as specified in the Course Mapping Table below:

GCU Unit	Maps To
Introduction to Programming Principles for Games Software Development (COMU108/A)	DH3E 35 Structured Programming DH35 34 Computing: Planning
Introduction to Professional Issues and Practice in Computing (COMU107/A)	D76H 35 Professional Issues In Computing
Introductory Calculus (MATM155/A)	DP8F 34 Mathematics: Calculus and Matrices for Computing
Computer Technology (COSU101/B)	DH2T 35 Computer Architecture 1 DH33 34 Computer Operating Systems 1
Fundamental Programming Principles 2 (COSU103/B)	D76V 35 Object Oriented Programming
Introduction to Game Level Design (COMU106/B)	DH3E 35 Structured Programming DH35 34 Computing: Planning D76V 35 Object Oriented Programming DE2N 35 3D Modelling and Animation DP8G 34 HNC Graded Unit

Table 2: Course Mapping Table

HNC Computer Games Development students will articulate to year two of the BSc Computer Games Technology course at the University of Paisley. The QDT also held initial discussions regarding articulation to Abertay University.

3 Aims of the award

3.1 General aims of the award

This **HNC Computer Games Development** award has a range of broad aims which are generally applicable to all equivalent Higher Education qualifications. Some of these general aims are to:

- 1 Develop the candidate's knowledge and skills such as planning, designing, analysing and synthesising.
- 2 Develop employment skills and enhance candidates' employment prospects.
- 3 Enable progression within the Scottish Credit and Qualifications Framework.
- 4 Develop study, research and interpersonal skills.
- 5 Develop transferable skills including Core Skills.
- 6 Provide academic stimulus and challenge, and foster an enjoyment of the subject.

3.2 Specific aims of the award

The specific aims of the **HNC Computer Games Development** award are to:

- 1 Prepare candidates for employment in a junior developer role within the computer games industry or a junior software developer role within the IT industry generally.
- 2 Develop a range of contemporary vocational skills relating to the development of computer games appropriate to employment at junior developer (or equivalent) level.
- 3 Provide a flexible curriculum to meet the needs of candidates in employment, recognising their existing experience and skills.
- 4 Prepare candidates for progression to further study in Computer Games Development or a related discipline.

Mandatory Units Mapped to General and Specific Aims

Unit No.	Title	Aim
DH21 34	Working Within A Project Team (Comm, WwO @ H)	All
DH2T 34	Computer Architecture 1 (Using Number @ Int 2, Using Graph Info @ H)	2,3,5-10
D75X 34	Information Technology: Applications Software 1 (IT @ H)	2,3,5-10
DP8G 34	Computer Games Development: Graded Unit 1 (Project) (PS @ H, WwO @ Int 2)	All
DE2N 35	3D Modelling & Animation	All
DP8F 34	Mathematics: Calculus and Matrices for Computing (Numeracy @ H)	2,3,5-10
D76V 35	Software Development: Object Oriented Programming	All
DH35 34	Computing: Planning Problem Solving(CT @ H)	All

Table 3: Unit Mapping to Aims

4 Access to award

Prior Experience and/or Qualifications

As with all SQA qualifications, access will be at the discretion of the Centre and the following recommendations are for guidance only.

Some examples of appropriate formal entry qualifications are specified below. They are not exhaustive or mutually exclusive and may be offered in a variety of combinations.

- (i) Mathematics and any other National Course at Higher, with a minimum Grade C, together with three Standard Grade passes at level 3 or above.
- (ii) An SVQ at level 3 in Information Technology or other relevant area together with Higher Mathematics, at minimum Grade C, or equivalent.
- (iii) Relevant National Units at appropriate levels, including an equivalent to Higher Mathematics, and Core Skills Units at Intermediate 2 or Higher.

Different combinations of relevant National Qualifications, Vocational Qualifications and equivalent qualifications from other awarding bodies may also be acceptable, as would suitable vendor qualifications at an appropriate level.

It would be advisable for candidates to have some prior knowledge of computing or information technology although formal qualifications may not be necessary if suitable experience had been gained informally or through work experience. Centres may wish to give consideration to inferred or actual evidence of candidates' Core Skills.

Mature candidates with suitable work experience may be accepted for entry provided the enrolling Centre believes that the candidate is likely to benefit from undertaking the award. This is based on the philosophy that entry is open to anyone who can show a reasonable potential for success through formal qualifications, creditable experience or otherwise.

Core Skills Profile for Entry

The recommended Core Skill profile for entry to this award is defined in the following table.

Core skill	Level
Communication	
Oral Communication	Intermediate 2
Written Communication	Intermediate 2
Numeracy	
Using Graphical Information	Intermediate 2
Using Number	Higher
Information Technology	Intermediate 2
Problem Solving	
Critical Thinking	Intermediate 2
Planning and Organising	Intermediate 2
Reviewing and Evaluating	Intermediate 2
Working with Others	Intermediate 2

Table 4: Recommended Core Skill entry profile

Candidates with Work Experience

The Centre should ensure that candidates with prior work experience can demonstrate the appropriate Core Skill entry level, either through formal qualifications or informally at the Centre's discretion.

Candidates Whose First Language Is Not English

The Centre should ensure that candidates whose first language is not English and who have not been through the British School system can demonstrate good communication skills (oral and written) in English. The candidate must also demonstrate the appropriate Core Skill level.

Ideally the candidate should have a suitable English for Speakers of Other Languages (ESOL) qualification. The QDT recommends that the candidate has the SQA Higher ESOL Unit or equivalent. Suitable equivalents are an IELTS score of 5.5+ or possession of the Cambridge ESOL Certificates; C.P.E, C.A.E or F.C.E.

5 Award structure

HNC Computer Games Development — Conditions of Award

A total of 12 credits must be achieved, comprising 96 SCQF credit points, to gain an HNC and this must incorporate 48 SCQF points at SCQF level 7. An HNC will normally include one Graded Unit of 8 SCQF points at SCQF level 7.

To gain the award of HNC Computer Games Development it is necessary to gain a total of 10 credits from the mandatory Units (Table A), and the remaining Units should be selected from Table B to make a total of 12 credits.

A mapping of the Award Aims to the Units is also provided.

Contextualisation plays a major part in the structure of this award. The mandatory and optional subjects will favour a games design and development approach (please refer to *Appendix 1: Contextualisation* for more detail). The Higher National Graded Unit — Project (DP8G 34) is a unique Unit giving the candidate the opportunity to work as part of a games design and development team and to integrate the knowledge and skills as specified in the next section, entitled ‘Graded Unit’.

Table A — Mandatory Units

HNC Computer Games Development				
Unit No.	Title	Level	Credit	Aim
DH21 34	Working Within A Project Team (Comm, WwO @ H)	7	1	All
DH2T 34	Computer Architecture 1 (Using Number @ Int 2, Using Graph Info @ H))	7	1	2,3,5-10
D75X 34	Information Technology: Applications Software 1 (IT @ H)	7	1	2,3,5-10
DP8G 34	Computer Games Development: Graded Unit 1 (Project) (PS @ H, WwO @ Int 2)	7	1	All
DE2N 35	3D Modelling and Animation	8	2	All
DP8F 34	Mathematics: Calculus and Matrices for Computing (Numeracy @ H)	7	1	2,3,5-10
D76V 35	Software Development: Object Oriented Programming	8	2	All
DH35 34	Computing: Planning Problem Solving(CT @ H)	7	1	All

Table B — Remainder of Units selected to make 12 credits

HNC Computer Games Development				
Unit No.	Title	Level	Credit	Aim
DH3E 35	Software Development: Structured Programming	8	2	All
DH33 34	Computer Operating Systems 1	7	1	2,3,5-10
D76H 35	Professional Issues In Computing	8	2	All
D76P 35	Software Development Developing for the World Wide Web	8	2	All
D76J 35	Project Management	8	1	All
D77E 35	Software Development: Object Oriented Design	8	2	All
D76L 35	Software Development: Abstract Data Structures	8	3	All
DH2V35	Computer Architecture 2 (Numeracy @ H)	8	1	2,3,5-10
DFD6 35	Human Computer Interface	7	1	All
DF61 35	Internet: Web Technology and Security	7	1	All
DG6E 34	Work Role Effectiveness (2003)	7	3	All
DE1K 33	Workplace Communication in English (Communication @ Int2)	6	1	All

Graded Unit**Summary**

The HNC Computer Games Development Graded Unit — Project (DP8G 34) requires the candidate to design and implement a working computer game or part of a game. The game should be real-time and interactive and include non-player characters. For example a 3-D dungeon based first person shooter or a 2-D sprite based reaction game, with the computer playing the role of the opponent. The software tool used to create the game should be of a level which requires the candidate to produce significant amounts of coding. Hence it would be inappropriate to use a dedicated level-editor (such as Half-Life editor) or require the candidate to use low-level statements (such as DirectX function calls). An appropriate tool for creating the project would be a standard programming language, with additional graphics oriented abilities (such as DarkBASIC Pro, BlitzBASIC or the Games Creators Dark SDK for C++). This Group Award Graded Unit is designed to test the application of knowledge and skills in the planning, design, execution and evaluation of such a project based assessment task.

The candidate will be required to work as part of a team, but also work individually. In the Planning Stage (Stage 1) of the project, the candidate will be required to do individual research and produce an individual report showing evidence of:

- ◆ analysing what is involved in the project
- ◆ developing a suitable approach to deal with the project
- ◆ justifying the selection of this approach

The rest of the Planning Stage and all of the Developing Stage (Stage 2) will involve the candidate working as part of the team. It is important to emphasise that the candidate should be involved in all areas of the project, but can get more heavily involved in some areas of the project where he/she feels they have particular skills. The candidate must demonstrate that they are making an equal contribution to the project team. Such contributions will be documented by way of sets of minutes produced after fortnightly meetings between the project team and the project supervisor, along with the candidate's individual personal weekly log. The QDT recommends that the project supervisor use checklists to document the candidate's organisational and interpersonal skills.

The Evaluation Stage (Stage 3) will involve the candidate working individually and producing a detailed evaluation report which would include peer evaluation.

The assessment specification will provide further details of the project and the evidence which the candidates are expected to produce. The specification will offer advice in terms of the way the project is taken forward in that it fits in with the Centre's resources and the interests and personal strengths of the candidates.

How the Graded Unit Integrates the Principal Aims of the Award

This Group Award Computer Games Development: Graded Unit 1 (Project) (DP8G 34) is designed to provide evidence that the candidate has achieved the following principal aims of the HNC — Computer Games Development.

- ◆ to develop the candidate's knowledge and skills such as planning, designing, analysing and synthesising
- ◆ to develop employment skills and enhance candidates' employment prospects
- ◆ to develop study, research and interpersonal skills
- ◆ to develop transferable skills including Core Skills
- ◆ to provide academic stimulus and challenge, and foster an enjoyment of the subject
- ◆ to prepare students for progression to further study in Computer Games Development or a related discipline
- ◆ to prepare students for employment in a junior developer role within the computer games industry or a junior software role within the IT industry generally

This Graded Unit (DP8G 34) integrates knowledge and skills contained in the following mandatory Units:

DE2N 35	<i>3D Modelling and Animation</i>
DH35 34	<i>Computing: Planning</i>
D75X 34	<i>Information Technology: Applications Software 1</i>
D76V 35	<i>Software Development: Object Oriented Programming</i>
DH21 34	<i>Working Within a Project Team</i>

Depending on the optional Units selected by the Centre, the knowledge and skills contained in the following optional Units can be utilised as part of this Graded Unit:

DH3E 35	<i>Software Development: Structured Programming</i>
D76P 35	<i>Software Development: Developing for the World Wide Web</i>
D76L 35	<i>Software Development: Abstract Data Structures</i>

The instrument of assessment for the Graded Unit is a project based assessment task. It is designed to test the practical skills, knowledge and understanding of the candidate. The candidates are either provided with a games project brief, or can create one of their own, which allows them to demonstrate their creative, technical, interpersonal and organisational skills.

The Candidate will produce evidence to show:

- ◆ a plan of action (individual report, team plan)
- ◆ a detailed game level design (team design)
- ◆ evidence of the product (a working computer game or part thereof — team)
- ◆ evidence of the documentation that underpins the practical hands-on activity (team), including all meeting documentation (team) and weekly log book (individual)
- ◆ evidence that shows the evaluation of the practical assignment and peer evaluation of the individual team members (individual report)

The assessment will be based on the expected end result of the activity (a fully designed and working computer game or part thereof) and also the carrying out of the activity.

Candidates will be asked to:

- ◆ interpret the project brief (provided by the Centre or chosen by the team)
- ◆ work effectively both individually and as part of a project team
- ◆ research and develop the chosen product
- ◆ produce a full game level design for the product
- ◆ produce and test the product
- ◆ evaluate the product

Graded Unit Transferable Core Skills

An important aim of the HNC Computer Games Development is ‘to develop transferable skills including Core Skills’. The Computer Games Development: Graded Unit 1 (DP8G 34) enables the candidate to be involved in the following:

- ◆ the planning, designing, organising, implementing and evaluation of a task
- ◆ working within a group
- ◆ documenting the group meetings and subsequent courses of action

The lecturer will attend the group meetings on a fortnightly basis.

Individually the candidate will carry out research on the project brief and shall document such research. The candidate will also individually produce a final evaluation report on the project (this will include peer evaluation) together with a weekly log of his/her contribution to the project. The rest of the Planning stage and the whole of the Development stage will be carried out by the group.

This Problem Solving Core Skill is embedded into the Graded Unit — Project (DP8G 34). The Working with Others Core Skill is also embedded at Intermediate 2. There may be opportunities for the candidate to gather evidence towards the Communication and Numeracy Core Skills. However there is no automatic certification of these Core Skills or Core Skill components.

Core Skills Entry/Exit Profile

The recommended entry and exit Core Skill profiles for this award are defined in the table below.

Core Skill	Entry Profile	Exit Profile
Communication		
Oral communication	Intermediate 2	Higher
Written communication	Intermediate 2	Higher
Numeracy		
Using Graphical Information	Intermediate 2	Higher
Using Number	Higher	Higher
Information Technology	Intermediate 2	Higher
Problem Solving		
Critical Thinking	Intermediate 2	Higher
Planning and Organising	Intermediate 2	Higher
Reviewing and Evaluating	Intermediate 2	Higher
Working with Others	Intermediate 2	Higher

Table 5: Core Skills — recommended entry and exit profiles

Transition Arrangements and Credit Transfer

This HNC in Computer Games Development has been designed within the SQA's new HN Design Principles so that there is parity across HN frameworks in other vocational sectors.

There are full credit transfer arrangements in place for candidates in possession of any of the framework units, **as per the general mapping credit arrangements specified by the SQA**. The specific Units in question are detailed in a credit transfer table on Page 21. In the future, when more Centres offer the HNC Computer Games Development, the credit transfer arrangements may be revised accordingly.

6 Approaches to delivery and assessment

Context and content

The HNC Computer Games Development is a unique course. This uniqueness is demonstrated by the following points:

- ◆ combination of skill-sets appropriate for computer games development
- ◆ unique framework
- ◆ contextualisation
- ◆ new Units: DP8G 34 *Computer Games Development: Graded Unit 1* and DP8F 34 *Mathematics: Calculus and Matrices for Computing*

An holistic approach has been taken with the creation of this course. The contextualisation of appropriate Units will favour a games design and development approach. The Higher National Computer Games Development: Graded Unit 1 (DP8G 34) gives the candidate the opportunity to work as part of a games design team and to integrate the knowledge and skills contained in the mandatory and optional Units as specified in the previous section, entitled 'Graded Unit'.

The assessment context of individual Units should be set within a typical assessment loading for an HNC. All Units operate on a basis of continual assessment where the candidate builds on their knowledge and skills throughout the duration of the Unit. Some Units have one assessment in a closed-book setting which will further test the underpinning knowledge and skills, as demonstrated by the mandatory Units, DH2T 34 *Computer Architecture 1* and D76V 35 *Software Development: Object Oriented Programming*. This methodology is to ensure that candidates attain the standards needed to use Units as building blocks which allow for progression through the HNC framework.

A large proportion of Units take a 'project' approach using the product of a previous assessment as the foundation of the next. Project scenarios will all favour a games design and development approach. The purpose is to give the candidate a true reflection of how items being studied integrate and relate to industrial practice.

A holistic approach to assessment is recommended where possible, by assessing across a number of Outcomes within single Units or across a number of Units. The latter may be demonstrated by the possible cross-assessment of Units, DH21 34 *Working Within a Project Team* and the DP8G 34 *HNC Computer Games Development Graded Unit* respectively. Cross-assessment is also evident between D75X 34 *Information Technology: Applications Software 1* and D76V 35 *Object Oriented Programming*. The latter Unit involves candidates having to create a technical manual and player guide. This could be cross-assessed in Outcome 2 of D75X 34 *Information Technology: Applications Software 1* (Appendix 1: Contextualisation).

Some of the Evidence Requirements may be produced using e-assessment. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical abilities). The use of an e-portfolio approach to assessment is also encouraged.

Assessment Strategy

There are two types of Unit within this award: (1) Units; and (2) a Graded Unit (project). Both types of Unit are **internally assessed** and **externally moderated**.

Units are assessed on a pass/fail basis. The assessment of Units takes the form of practical assignments and knowledge assessments. **Where appropriate, all assignments will be contextualised towards a games design and development approach.** For further guidance on contextualisation please refer to Appendix 1: Contextualisation.

This award includes a Computer Games Development: Graded Unit 1 (DP8G 34) which takes the form of a games design and development project. Successful completion of this Unit will ensure that candidates possess the key aims and objectives of the award giving the application of knowledge expected of games programmers and designers and are able to work within a games development team; thus facilitating progression to Higher Education or Industry. Candidates who pass the Computer Games Development: Graded Unit 1 (DP8G 34) will receive a grade between A and C. The Graded Unit specification defines the standard of performance required to achieve each of these grades.

HNC Computer Games Development: Suggested Delivery Schedule

The operational aspect of the delivery sequence is at the discretion of the individual Centres. The Qualification Design Team (QDT) recommends that mandatory Units from Table A should be taught in the following semesters.

HNC Computer Games Development — Mandatory Units				
Unit No.	Title	Level	Credit	Semester
DH21 34	Working within a Project Team	7	1	2
DH2T 34	Computer Architecture 1	7	1	1
D75X 34	Information Technology: Application Software 1	7	1	2
DP8G 34	Graded Unit 1 (Project)	7	1	2
DE2N 35	3D Modelling and Animation	8	2	1, 2
D76V 35	Software Development: Object Oriented Programming	8	2	2
DP8F 34	Mathematics: Calculus and Matrices for Computing	7	1	1
DH35 34	Computing: Planning	7	1	1

An example of how a further 5 credits from the optional Table B (12 credits for HNC, but 15 credits for articulation/further progression) can be demonstrated below:

HNC Computer Games Development — Optional Units				
Unit No	Title	Level	Credit	Semester
DH33 34	Computer Operating Systems 1	7	1	2
DH3E 35	Software Development: Structured Programming	8	2	1
D76H 35	Professional Issues In Computing	8	2	1,2

The QDT recommends that the DH35 34 *Computing: Planning* Unit is delivered alongside the D76V 35 *Software Development: Object Oriented Programming* Unit. Alternatively Centres may wish to deliver the DH35 34 *Computing: Planning* Unit alongside one of the following optional associate Units:

DH3E 35 *Software Development: Structured Programming*
D76P 35 *Software Development: Developing for the World Wide Web*

If a Centre decides to deliver the DH35 34 *Computing: Planning* Unit alongside one of the above optional associate Units, the QDT recommends that the D76V 35 *Software Development: Object Oriented Programming* Unit be delivered after candidate completion of the optional associate Unit.

Use of e-assessment

The use of e-assessment is encouraged and should be managed in a number of ways.

It is the intention of the development team to identify and plan specific areas where on-line assessment techniques for closed-book assessments could be used in the assessment process. Common terminology has been used throughout the Units. This common terminology is given below:

‘There is an opportunity for a candidate to be assessed on-line, subject to meeting the prescribed assessment conditions.’

When presenting this assessment on-line the following assessment methods, where appropriate, may be selected:

- ◆ Multiple-choice
- ◆ Drag and drop
- ◆ Multiple response
- ◆ Mix and match
- ◆ A combination of the above

It is expected that most of the questions will be of the multiple choice variety. Care should be taken to ensure that the questions are pitched at the appropriate level and are unambiguous.

Possibilities of using online assessment and testing methods for assessing underpinning knowledge and skills have been identified within the following Units (with their relative Outcomes identified) below:

	Unit title	Outcome
DH2T 34	Computer Architecture 1	1
D75X 34	Information Technology: Applications Software 1	None
DH35 34	Computing: Planning	None
DH33 34	Computer Operating Systems 1 (Optional Subject)	1
DH21 34	Working within a Project Team	None
D76V 35	Software Development: Object Oriented Programming	2 (part only)
DH3E 35	Software Development: Structured Programming (Optional Subject)	2 (part only)
D76H 35	Professional Issues In Computing (Optional Subject)	None
DP8G 34	HNC Graded Project	None
DE2N 35	3D Modelling and Animation	None
DP8F 34	Mathematics: Calculus and Matrices in Computing	All

Table 6: On-line Assessment

Identified On-line Assessment Opportunities

The use of e-portfolio assessment is encouraged in other areas where deemed appropriate by the Centre.

Provided that normal standards for validity and reliability are observed some of the Evidence Requirements may be produced using e-assessment. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical abilities). The following SQA publications should be used for further information on e-assessment: (1) *SQA Guidelines on Online Assessment for Further Education* (March 2003) and (2) *Assessment & Quality Assurance in Open & Distance Learning* (Feb. 2001).

Open Learning and e-learning

The award may be delivered by open and distance learning methods. Additional planning and resources will be required for candidate support, assessment and reassessment. In respect of the latter, a combination of new and traditional authentication tools and techniques may need to be devised. Centres should have good quality assurance procedures which fully support open and distance learning.

Development of Core Skills within the Award

Higher (SCQF level 6) is the most advanced level of Core Skill currently defined by the Scottish Qualifications Authority. The QDT considered it appropriate to recommend Intermediate 2 as an entry level for all Core Skills for HNC, with the exception of Numeracy — Using Number at Higher. Candidates who had completed a Scottish Group Award at Higher would have Intermediate 2 or above in each of the Core Skills.

It is recognised that many candidates, particularly adult returners, may not possess a specific Core Skills Profile on entry and hence entry level is recommended only. **The recommended exit level Core Skills Profile is what the QDT considered would denote the level of proficiency normally required to enable candidates to derive the maximum benefit from studying the HNC Computer Games Development award in terms of opportunities for further study (including Higher Education), personal development and employment.**

The HN Design Principles designed by the SQA in June 2004, gives a high prominence to the importance of Core Skills. Such Core Skills are seen by employers as a vital component of the skill-set of candidates, hence their importance in this HNC award.

The QDT considered it important to develop each of these Core Skills within the HNC award, and thus the recommended exit level for the Core Skills profile has been set at Higher.

The QDT gave due consideration to setting the Numeracy Core Skill exit profile to Higher level. Candidates are recommended to have this entry Core Skill at Higher by possessing the Higher Mathematics qualification. The QDT considered this level of Core Skill necessary as candidates require good numeracy skills when dealing with more technical 3D animation and games programming concepts. Numeracy at Intermediate 2 is embedded in the mandatory DH2T 34 *Computer Architecture 1* Unit (the Using Graphical Information element is embedded at Higher). Numeracy

at Higher is embedded into the mandatory DP8F 34 *Mathematics: Calculus and Matrices in Computing*.

The QDT also recognises that for articulation to a degree programme, the Numeracy exit Core Skill should be at Higher.

Working with Others and Communications are embedded at Higher, in the mandatory Unit; DH21 34 *Working within a Project Team*. The *HNC Computer Games Development: Graded Unit 1 (DP8G 34)* will also provide opportunities for candidates to obtain such Core Skills, but there is no automatic certification of such Core Skills. The Graded Unit already has Working With Others embedded at Intermediate 2.

The three elements of Problem Solving at Higher, will be carried by the mandatory Units: DH35 34 *Computing: Planning (Critical Thinking)* and the DP8G 34 *HNC Computer Games Development Graded Unit 1*.

For additional information on the opportunities/signposts to achieve Core Skills, please refer to Appendix 2.

Embedded Core Skills Mapping of the Group Award: Computer Games Development (Mandatory and Optional Units)

Unit No	Unit Name	Written Comms: Reading	Written Comms: Writing	Oral Comms	Using Graphical Info	Using Number	Using IT	Problem Solving: CT	Problem Solving: P & O	Problem Solving: R & E	WwO
DH21 34	Working Within a Project Team	H	H	H							H
DP8G 34	HNC Graded Unit							H	H	H	Int 2
DH2T 34	Computer Architecture 1				H	Int 2					
D75X 34	IT: Applications Software 1						H				
DH35 34	Computing: Planning							H			
DP8F 34	Mathematics: Calculus and Matrices for Computing				H	H					
DH2V 35	Computer Architecture 2				H	H					

Table 7: Embedded Core Skills

Additional Resource Requirements

Centres offering this award must ensure that they have the necessary resources (in terms of equipment and staff) in order to deliver the award at the expected standard. In particular, staff delivering this award should have in-depth knowledge, at degree or post-graduate level, of software development **in a computer games context**. Such skills and knowledge may be evidenced by having been employed in the computer games industry **or** by having studied computer games development.

This section details the approaches to Delivery and Assessment that are required. **Please also refer to Appendix 1: Contextualisation for further information on the resources required.**

7 General information for centres

Further information on internal and external moderation can be found in SQA's Guide to Assessment and Quality Assurance for Colleges of Further Education (www.sqa.org.uk).

Candidates with Support Needs

This Group Award is intended for all candidates in possession of the necessary entrance requirements. Centres must ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative assessment arrangements.

Special assessment arrangements are intended to enable candidates to demonstrate their level of competence in relation to the qualification standards. They are not intended to compensate for lack of competence and should not:

- ◆ give an unfair advantage to candidates
- ◆ reduce the validity and reliability of the assessment or compromise the credibility of the award
- ◆ mislead users of SQA certificates about candidates' competence

Candidates with a physical disability, a sensory impairment, a specific learning difficulty, or a temporary disability at the time of the assessment may be eligible for special assessment arrangements in line with these principles.

For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (December 2001, AA0645/3).

Internal Moderation of Assessments

In order to maintain rigorous and credible national standards, all assessments must be valid and assessment decisions reliable. Centres should ensure that the application of assessment tasks is practicable, ie they make the best use of human and physical resources and time.

The aim of internal moderation is to ensure that staff in Centres are making consistent assessment decisions in accordance with the assessment criteria defined in the SQA qualifications. Centres can do this in slightly different ways, perhaps depending on their size. What is important is that all staff are aware of the need for a

system, and adhere to it. It is good practice to nominate an internal moderator to oversee the various processes involved in internal moderation for each Unit, and to act as link with the SQA external moderator.

A successful result of internal moderation is that Centres avoid the scenario where an inexperienced individual member of staff is responsible for devising and applying internal assessments without the assessment material having been subject to wider centre scrutiny, expertise and endorsement.

External Moderation of Assessments

External moderators always begin from the premise that Centres have made assessment decisions correctly, and that the purpose of the external moderation exercise is to confirm the Centres' decisions. They assume that all candidates entered for the same qualification are assessed to a common standard ie that internal moderation is operating effectively.

External moderation focuses on the **validity** of the assessment instruments, how they are applied, and the **reliability** of the Centres' assessment decisions.

Graded Units are always subject to external moderation. With respect to the HNC Computer Games Development Graded Unit, this is project based. It is up to Centres to take reasonable steps to ensure that the project is the work of the candidates and that each candidate has contributed equally and fairly to the work of the group. The final grading given should reflect the quality of the candidate's evidence at the time of the completion date.

Credit Transfer

This HNC in Computer Games Development has been designed within the SQA's new HN Design Principles so that there is parity across HN frameworks in other vocational sectors. There are full credit transfer arrangements in place for candidates in possession of any of the framework Units, **as per the general mapping credit arrangements specified by the SQA**. The specific Units in question are detailed in a credit transfer table below. In the future, when more Centres offer the HNC Computer Games Development, the credit transfer arrangements may be revised accordingly.

HNC Computer Games Development Framework 2005		SQA Credit Transfer Units	
Unit No.	Unit title	Unit No.	Unit title
DH2T 34	Computer Architecture 1	D75P 34	Computer Architecture
D76V 35	Software Development: Object Oriented Programming	DH3C 35	Software Development: Object Oriented Programming
DH35 34	Computing: Planning	D76W 34	Software Development: Program Planning
DH3E 35	Software Development: Structured Programming	D76X 35	Software Development: Procedural Programming
D76H 35	Professional Issues In Computing	DM3D 35	Professional Issues In Computing
D76P 35	Software Development: Developing for the World Wide Web*	DH32 35	Software Development: Developing for the World Wide Web*
D76J 35	Project Management	DM30 35	Project Management 1

Table 8: Credit Transfers (as published in the HN Computing Arrangements)

Full credit transfer is subject to Core Skill equivalences being mapped between Units or achieved by the candidate. However, due to the contextualisation of this award, it may not be appropriate to allow credit transfer if a candidate has previously undertaken the learning in a different environment.

Any credit transfer issues are at the discretion of the Centre and it may be necessary for a Centre to seek additional guidance from SQA Quality Assurance.

8 General information for candidates

Skills/Knowledge Provided and Employment Prospects

The HNC Computer Games Development is a unique course. On completion of this course the candidate will have achieved the following:

- ◆ skills in planning, designing, analysing and synthesising
- ◆ enhanced employment skills and employment prospects
- ◆ ability to further progress within the Scottish Credit and Qualifications framework
- ◆ developed study, research, interpersonal and transferable skills, including Core Skills
- ◆ ready for progression to further study in Computer Games Development or a related discipline.
- ◆ prepared for employment in a junior developer role within the computer games industry or a junior software role within the IT industry generally

The Higher National Computer Games Development: Graded Unit 1 (DP8G 34) gives the candidate the opportunity to work as part of a games design team and to integrate the knowledge and skills contained in the mandatory and optional Units.

All Units operate on a basis of continual assessment where the candidate builds on their knowledge and skills throughout the duration of the Unit. Some Units have one assessment in a closed-book setting which will further test the underpinning knowledge and skills, as demonstrated by the mandatory Units, DH2T 34 *Computer Architecture 1* (and D76V 35 *Software Development: Object Oriented Programming*). This methodology is to ensure that candidates attain the standards needed to use Units as building blocks which allow for progression through the HNC framework.

A large proportion of Units take a 'project' approach using the product of a previous assessment as the foundation of the next. Project scenarios will all favour a games design and development approach. The purpose is to give the candidate a true reflection of how items being studied integrate and relate to industrial practice.

Progression to University

The award is designed to articulate with a proposed HND Computer Games Development award which the Qualification Design Team hope to design at a future date. Students successfully completing the HNC would be accepted onto the HND Computer Games Development (on successful validation).

The HNC Computer Games Development award can be used as a foundation to move forward and articulate into HE in a multitude of award areas which have a hybrid content containing computing as a discipline. The SCQF system should assist a candidate in achieving this move, however, an HNC on its own collects 96 SCQF credit points and it is normal, and would be expected, that a candidate would achieve 120 SCQF credit points to gain entry into the 2nd year of any degree course (ie candidate to achieve 15 credits in the HNC year).

Formal articulation agreements may exist between individual Centres offering the HNC in Computer Games Development and their feeder HE institution and this should be encouraged. It may be possible for a candidate to articulate directly to second year at an HE institution by means of the SCQF system. For example:

- ◆ BSc/BSc (Hons) Games Software Development
- ◆ BSc/BSc (Hons) Computer Games Technology

It is anticipated that in the future many students will progress to a degree via the HND route ie HNC -> HND -> B.Sc. However, some students may progress directly from the HNC to the second year of a degree programme.

The Qualification Design Team has collaborated with Glasgow Caledonian University, Paisley University and Abertay University in the design and development of this course. The aim of such collaboration being, that students would progress to Year 2 of these institutions' BSc. Computer Games Software/Technology courses.

In particular, this award has been designed to match the first year of the BSc/ BSc (Hons) Games Software Development course at Glasgow Caledonian University. The Course Mapping Table detailing which GCU Units map to the HN Units is shown below. Also shown is a Unit mapping table for COMU106/B Introduction to Game Level Design:

Course Mapping Table

BSc Games Software Development (Glasgow Caledonian University)
HNC Computer Games Development

Unit Titles

GCU	Maps To
Introduction to Programming Principles for Games Software Development COMU108/A	DH3E 35 <i>Structured Programming</i> DH35 34 <i>Computing: Planning</i>
Introduction to Professional Issues and Practice in Computing COMU107/A	D76H 35 <i>Professional Issues In Computing</i>
Introductory Calculus MATM155/A	DP8F 34 <i>Mathematics: Calculus and Matrices for Computing</i>
Computer Technology COSU101/B	DH2T 35 <i>Computer Architecture 1</i> DH33 34 <i>Computer Operating Systems 1</i>
Fundamental Programming Principles 2 COSU103/B	D76V 35 <i>Object Oriented Programming</i>
Introduction to Game Level Design COMU106/B	DH3E 35 <i>Structured Programming</i> DH35 34 <i>Computing: Planning</i> D76V 35 <i>Object Oriented Programming</i> DE2N 35 <i>3D Modelling and Animation</i> DP8G 34 <i>HNC Graded Unit</i>

Table 9: Mapping Guidance for Candidate

Core Skills developed in the Award

On successful completion of this Award, the candidate will have achieved the following Core Skills:

Core Skill	Exit Profile
Communication	
Oral communication	Higher
Written communication	Higher
Numeracy	
Using Graphical Information	Higher
Using Number	Higher
Information Technology	Higher
Problem Solving	
Critical Thinking	Higher
Planning and Organising	Higher
Reviewing and Evaluating	Higher
Working with Others	Higher

Table 10: Core Skills achieved

9 Glossary of terms

SCQF: This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at www.scqf.org.uk

SCQF credits: One HN credit is equivalent to 8 SCQF credit points. This applies to all HN Units, irrespective of their level.

SCQF levels: The SCQF covers 12 levels of learning. HN Units will normally be at levels 6–9. Graded Units will be at level 7 and 8.

Subject Unit: Subject Units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Graded Unit: Graded Units assess candidates' ability to integrate what they have learned while working towards the Units of the Group Award. Their purpose is to add value to the Group Award, making it more than the sum of its parts, and to encourage candidates to retain and adapt their skills and knowledge.

Dedicated Core Skill Unit: This is a Unit that is written to cover one or more particular Core Skills, eg HN Units in Information Technology or Communications.

Embedded Core Skills: This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

Signposted Core Skills: This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

Qualification Design Team: The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the HNC/D from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

Consortium-devised HNCs and HNDs are those developments or revisions undertaken by a group of centres in partnership with SQA.

Specialist single centre and specialist collaborative devised HNCs and HNDs are those developments or revisions led by a single centre or small group of centres who provide knowledge and skills in a specialist area. Like consortium-devised HNCs and HNDs, these developments or revisions will also be supported by SQA.

10 Appendices

Appendix 1: Contextualisation

Appendix 2: Signposting of Core Skills

See following pages for appendices.

Contextualisation

Contextualisation of:

DE2N 35 3D Modelling and Animation

Content and context

This Unit is intended as an introduction to the basic principles of 3D modelling and animation using an Industry standard 3D modelling package. It has been contextualised for an HNC Computer Games Development course, where the emphasis is on the learner's creativity and design flair.

This Unit forms part of the HNC Computer Games Development award and should be delivered within the context of the Group Award.

Instruments of Assessment

All the instruments of assessment are based on a single project that the student works through to achieve the three learning Outcomes.

The project involves the creation of a scene complete with 3D models using the intrinsic 3D primitives supplied with the package. The first learning Outcome requires the student to produce a treatment, storyboard and reference drawings to support the final project. The student must realise the need for strong supporting documentation.

The second and third learning Outcomes require the student to create a scene and populate it with 3D models. The student will be given a project brief from which they will produce a scene of their own design and populate it with the appropriate 3D models. After the models have been created the student will then animate them using basic keyframe techniques.

Assessors must ensure the authentication of the candidate's work, the level of work requires for the assessments is inherent in the Evidence Requirements.

Contextualisation of SD:

D76V 35 *Object Oriented Programming*

Content and context

This Unit is intended as an introduction to the basic principles involved in developing robust, reliable, efficient and maintainable object-oriented software. It has been contextualised for an HNC Computer Games Development course, where the emphasis is on developing particular skills appropriate to a digital entertainment domain. All of the standard good practice criteria are also stressed throughout the Unit, but with a games development flavour. In the production of videogames the learners acquire competence in the development of software solutions using the program language syntax and constructs required to reinforce object-oriented software development.

It forms part of an HNC Computer Games Development Group Award and should be delivered within the context of the Group Award.

Instruments of Assessment

All of the instruments of assessment are based on a single project that the student works through to achieve the four learning Outcomes. The exception is part of learning Outcome 2, which is assessed by a closed-book test.

The project should be a graphics-based game. For example, the game could be a card, puzzle, 2D platform, or 3D type, but must involve some form of file I/O to satisfy LO1 requirements. UML-based specifications should be supplied to each candidate and are required to be written for the game. Once the game has been implemented, the candidate must systematically test the game using recognised testing techniques, and then produce a technical manual and player guide which should include installation and error handling details.

All of the instruments of assessment are open-book except for the test in part of Outcome 2.

Assessors must ensure that all candidate submissions for the project based assessments are the work of the candidate. The level of work required for the assessments is inherent in the Evidence Requirements.

The closed-book part of Outcome 2 will test basic knowledge of the programming language being used and be assessed via a twenty question multiple choice test. The re-assessment test will be based on entirely different questions to the first assessment test.

Contextualisation of:

DH35 34 *Computing: Planning*

Content and context

This Unit is intended to enable candidates to develop generic knowledge and practical skills in the stages and techniques of program planning . It has been contextualised for an HNC Games Development course, where the emphasis is on developing skills appropriate to a digital entertainment domain. All of the standard good practice criteria are stressed throughout the module, but with a games development flavour.

It forms part of an HNC Games Development Group Award and should be delivered within the context of the Group Award.

Instruments of Assessment

Outcome 1: 'Produce a precise specification from a given brief'

Outcome 2: 'Derive a detailed design for the required specification.'

Outcome 3: 'Produce a test plan for the required specification.'

All of the instruments of assessment are open-book and of a practical nature.

Assessors must ensure that all candidate submissions for the practical assessments are the work of the candidate. The level of work required for the assessments is inherent in the Evidence Requirements.

For this Unit, contextualisation is apparent in the delivery rather than the written requirements of the Outcomes. The Unit is delivered in close liaison with either the Structured Programming or Object-Oriented Programming Units. The requirements brief which underlies all the Outcomes should be the gaming software project developed for that Unit.

Contextualisation of:

DH33 34 *Computer Operating Systems 1*

Content and context

This Unit is intended as an introduction to the basic principles involved in understanding and working with computer operating systems. It has been contextualised for an HNC Games Development course, where the emphasis is on developing skills appropriate to a digital entertainment domain. All of the standard good practice criteria are stressed throughout the module, but with a games development flavour.

It forms part of an HNC Games Development Group Award and should be delivered within the context of the Group Award.

Instruments of Assessment

Outcome 1: 'Describe the structure and function of an operating system'.

Outcome 2: 'Use a graphical environment'.

Outcome 3: 'Install & configure an operating environment'.

Outcome 4: 'Install & configure system & operating software.'

All but one of the instruments of assessment are open-book and of a practical nature. The exception is learning Outcome 1, which is assessed by a closed-book test.

Assessors must ensure that all candidate submissions for the practical assessments are the work of the candidate. The level of work required for the assessments is inherent in the Evidence Requirements.

The closed-book Outcome 1 will test basic OS knowledge and be assessed via a twenty question multiple choice test. The reassessment test will be based on entirely different questions to the first assessment test.

The clearest impact of contextualisation is in Outcome 4 where the examples are appropriate to a games environment: a joystick driver, animation player and a customisable game.

Contextualisation of:

D75X 34 *Information Technology: Applications Software 1*

Content and context

This Unit is designed to enable students to use information technology (IT) systems and applications independently to support a range of information processing activities. The Unit is designed to develop a knowledge of the theoretical concepts, principles, boundaries and scope of IT applications. These activities will be centred on using several software application packages to meet complex information requirements. The Unit will be contextualised for the HNC Computer Games Development course by cross assessing it with part of D76V 35 *Object Oriented Programming*. In that Unit the candidates have to create a technical manual and player guide. This would make for a practical and enjoyable method of candidates achieving learning Outcome two for IT Applications Software 1.

It forms part of an HNC Computer Games Development Group Award and should be delivered within the context of the Group Award.

Instrument of Assessment

There are two learning Outcomes, both largely of a practical nature.

- | | |
|---------------------------|---|
| Learning Outcome 1 | Prove knowledge and/or skills of; the different components of a computer system, the function of tools such as file manager, print manager and control panel, the ways in which data can be kept secure and the causes of common software and hardware problems and how to resolve them. |
| Learning Outcome 2 | Uses a range of software application packages, (at least four) to meet complex information requirements. The candidates will be given a comprehensive checklist of all evidence required to successfully complete this learning Outcome. They will then have to create a technical manual and player guide indicating on the checklist exactly where each requirement has been met. Given the complexity of the technical manuals and user guides shipped with today's games, this should make for a demanding, but hopefully enjoyable experience. |

Contextualisation of SD:

DH3E 35 *Structured Programming*

Content and context

This Unit is intended as an introduction to the basic principles and procedures involved in developing robust, reliable, efficient and maintainable software using a recognised structured methodology. It has been contextualised for an HNC Games Development course, where the emphasis is on encouraging learner creativity and design flair in a digital entertainment domain. All of the standard good practice criteria are also stressed throughout the module, but with a games development flavour. In the production of videogames the learners acquire competence in the development of software solutions using the program language syntax and constructs required to reinforce software development.

It forms part of an HNC Games Development Group Award and should be delivered within the context of the Group Award.

Instruments of Assessment

All of the instruments of assessment are based on a single project that the student works through to achieve the four learning Outcomes. The exception is part of learning Outcome 2; that is assessed by a closed-book test.

The project should be a graphics-based game. For example, the game could be a card, puzzle, 2D platform, or 3D-based type, but must involve some form of file I/O to satisfy LO1 requirements. Game design specifications should be supplied for the game. Once the game has been implemented, using a recognised game programming development environment (Dark Basic/C++, etc). The candidate must then systematically test the game using recognised testing techniques, and then produce a technical manual and user manual.

All of the instruments of assessment are open-book except for the test in part of Outcome 2.

Assessors must ensure that all candidate submissions for the project based assessments are the work of the candidate. The level of work required for the assessments is inherent in the Evidence Requirements.

The closed-book part of Outcome 2 will be assessed via a twenty question multiple choice test. The reassessment test will be based on entirely different questions to the first assessment test.

Contextualisation of:

D76H 35 *Professional Issues In Computing*

Content and context

This Unit is designed to provide candidates with an extensive understanding of the context within which they will work as a computing professional. The Unit will provide candidates with a broad knowledge of the ethical, social and legal aspects of professional computing environments. It has been contextualised for an HNC Computer Games Development course, by the creation of a detailed games oriented Case Study. All of the standard good practice criteria for computing professionals are also stressed throughout the Unit, but with a games development flavour.

It forms part of an HNC Computer Games Development Group Award and should be delivered within the context of the Group Award.

Instruments of Assessment

All of the instruments of assessment are based on a Case Study that the student studies and specifically refers to in order to achieve the three learning Outcomes.

The Case Study involves a collaboration between MFORMA, a leading global publisher and distributor of mobile entertainment, and CBS Sportsline, a leading name in on-line sports products and games. The Case Study is attached. All of the instruments of assessment are open-book.

Assessors must ensure that all candidate submissions for the Case Study based assessments are the work of the candidate. The level of work required for the assessments is inherent in the Evidence Requirements.

Case Study

Company Profile

MFORMA is a leading global publisher and distributor of mobile entertainment. Operating on four continents and in 39 countries, MFORMA provides interactive mobile entertainment content to more than 100 of the world's leading wireless operators. MFORMA's solution is complete, saving operators from integrating and managing multiple solutions, and giving them everything needed to successfully provide entertainment products to their subscribers. For brand owners and developers, MFORMA offers the shortest route to market and largest distribution network, and for consumers, MFORMA offers simply the best mobile entertainment products in the world.

Products and Services

- ◆ **Games.** MFORMA delivers a large catalogue of Java, SMS, MMS and WAP games, whether developed by its internal development studio or in collaboration with developer partners, MFORMA consistently turns out high quality titles, which have been universally praised and highly rated by independent game reviewers.
 - ◆ **News, Sports and Info Subscription Services.** MFORMA also delivers premium subscription information services, including sports, fantasy sports, news, search, mobile 411, shopping, travel, music, and astrology.
 - ◆ **Brand Management.** MFORMA's brand acquisition/publishing team has a successful record of maximising revenue from branded entertainment properties, including video games, film, television, and online media.
 - ◆ **Distribution.** MFORMA distributes content in virtually every corner of the globe and its distribution network is one of the worlds' largest.
 - ◆ **Porting.** MFORMA can deliver a game in any language, on any handset, to any market, and currently delivers approximately 5,000 product versions every month.
 - ◆ **Platform Management.** MFORMA's carrier-grade platform manages the deployment of downloadable games and applications for some of the world's largest networks.
-

D76H 35 *Professional Issues In Computing*

Background

MFORMA was founded by Daniel Kranzler, a veteran wireless industry executive and entrepreneur and his philanthropic venture fund, eFund, LLC, which combined the technology, content and talent of some of the early leaders in wireless entertainment to establish MFORMA in spring of 2001. In 2002 MFORMA acquired leading European mobile games developer, nGame Ltd of the UK, establishing MFORMA Europe, and in 2004 MFORMA acquired leading Korea developer, MobileGame Korea, establishing MFORMA Korea and an Asian distribution hub. In summer of 2004 MFORMA acquired Blue Beck, a leading UK mobile games developer, and FingerTwitch, a mobile software developer, and established a partnership with Magus-Soft, the leading mobile games developer in China. Today, MFORMA has offices in Bellevue, Washington (headquarters); San Diego, San Francisco and Los Angeles; London and Manchester, England; Beijing and Shanghai, China, and Seoul, Korea.

Management Team

Daniel Kranzler, Chairman and CEO
John Brimacombe, President and COO
Dave Arnold, Chief Financial Officer
Robert Tercek, Chief Strategy Officer, EVP Programming
Eric Bilange, Ph.D., Chief Technology Officer
Russell Klein, Executive Vice President, Corporate Development
Matt Edelman, Senior Vice President, Head of Publishing
Alex Green, Vice President, Sales
Nic Garner, Vice President, Production, Head of Studios
Scott Jensen, Vice President, Media Licensing
Glen Lu, Vice President, International Business, Head of Asia

Key Customers

Cingular/AT&T Wireless, Nextel, Sprint PCS, T-Mobile, Verizon Wireless, Bell Mobility, Telefonica, VIVO, 3, Mobilkom Austria, Mobistar, O2, Orange, Radiolinja, T-Mobile Group, Vodafone, Westel, Wind, China Mobile, Globe Telecom, SK Telecom Media.

Key Media Partners

Atari Interactive, CBS SportsLine, Viacom Consumer Products, Universal Studios Consumer Products, Activision, Marvel Entertainment, King Features, Primedia, Sergei Fedorov, Barry Bonds, Bill Parcels, Susan Miller Omni.

MFORMA and CBS SportsLine deliver a suite of innovative sports products

In mid-2004, MFORMA teamed up with CBS SportsLine, one of the most recognised names in sports. Mobile sports products were growing rapidly in popularity and CBS SportsLine saw that mobile presented a natural way to extend their strong online presence to a vast new audience of sports fans who are also mobile phone users. MFORMA felt strongly about the power of the CBS SportsLine brand and its ability to translate to mobile effectively.

The partnership agreement called for MFORMA to publish and distribute a full range of CBS SportsLine mobile products, such as arcade-style sports games, a wireless version of CBS SportsLine.com's top-rated fantasy sports products, and a subscription-based service that delivers scores, news, statistics, and play-by-play updates. The strategy was to build a suite of mobile sports products for CBS SportsLine.com that would not only generate revenue from new users, but would also engage existing CBS SportsLine.com online users in new ways.

MFORMA and CBS SportsLine are also collaborating on innovative marketing programs that are unprecedented, including a promotion offering discounted online fantasy league membership to those who download the Fantasy Football Companion mobile extension, and on-air promotions where CBS sports commentators are shown using the applications during halftime programs.

All in all, MFORMA will publish several arcade games and several versions of the Fantasy and GameCenter applications for subsequent years and additional sports. These products will roll out over the course of several years and will firmly establish CBS SportsLine as a force in mobile technology.

D76H 35 *Professional Issues In Computing*

Current Issues

CBS SportsLine employed a sub-contractor programmer to produce their on-line catalogue. The sub-contractor is currently in dispute with CBS SportsLine claiming that he fulfilled his contract and has not received full payment. He is claiming that his work is his intellectual property as CBS SportsLine has not fulfilled its contractual obligations. CBS SportsLine state that they are investigating the possibility that the sub-contractor downloaded music and accessed pornographic websites while on site at CBS SportsLine. MFORMA is aware of this situation but is sure that it will not be affected by any legal implications.

With the partnership agreement, MFORMA and CBS SportsLine are aware that they have to ensure that both Companies share the same standards codes of conduct. How this is to be achieved is under discussion.

Agreements have to be established as to who has the rights to new technology and new software produced as a result of the partnership.

MFORMA now envisage modifying their Senior Management Team structure with the addition of an ICT Director responsible for the coordination of all of the computing and technology areas within the group. This ICT Director will work closely with Eric Bilange, Chief Technology Officer who has appealed to the SMT for assistance, as this is a major challenge.

Signposting of Core Skills

The five Core Skills of Communication, Numeracy, Information Technology, Problem Solving and Working with Others have been designed into this award.

Communications

The Communication Core Skill (and Working with Others) is embedded at SCQF level 6 (Higher) within the mandatory Unit; DH21 34 *Working within a Project Team*. There may be opportunities to gather evidence towards this Core Skill in the HNC Computer Games Development Graded Unit — Project (DP8G 34).

Using IT

The Using IT Core Skill is included at SCQF level 6 (Higher) within the mandatory Unit D75X 34 *Information Technology: Application Software 1*.

Working with Others

Working with Others (and Communication) at SCQF level 6 (Higher) is embedded within the mandatory Unit; DH21 34 *Working within a Project Team*. There may be opportunities to achieve this Core Skill at Higher in the HNC Computer Games Development Graded Unit - Project (DP8G 34). Working with Others is already embedded in the Graded Unit — Project (DP8G 34) at Intermediate 2.

Problem Solving

The three elements of Problem Solving at SCQF level 6 (Higher) will be gained by a candidate's undertaking the study of the following mandatory Units:

DH35 34 *Computing: Planning (Critical Thinking)*
DP8G 34 *HNC Computer Games Development Graded Unit (all elements)*

And by cross-assessment, there may be opportunities to gain the Problem Solving Core Skill within:

DH21 34 *Working Within a Project Team*

Numeracy

The Numeracy Core Skill is embedded at SCQF level 5 (Intermediate 2) within the mandatory Unit DH2T 34 *Computer Architecture 1* (element 'Using Graphical Information' is at SCQF level 6 — Higher). The Numeracy Core Skill is embedded at SCQF level 6 (Higher) within the mandatory Unit DP8F 34 *Mathematics: Calculus and Matrices for Computing*.

It is also possible to achieve the Numeracy exit Core Skill at Higher by completing the following optional Unit:

DH2V 35 *Computer Architecture 2*