Unit 62: Interactive Media Authoring

Unit code: T/502/5769

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The aim of this unit is to develop knowledge and understanding of the principles of interactive media authoring for CDs and DVD-ROMs, and skills in the practical application of those principles. Learners will study the production process, plan a project for a CD or DVD ROM, and use the tools and features of interactive media authoring to complete that project.

Unit introduction

Who uses interactive media authoring? Web developers use it to add interactivity, sound and motion to their web pages. Animators use it to create animation for output to videotape or streaming web movies. Developers use it to create single-user games for distribution on CD ROM or DVD ROM. Educators use it to create interactive learning and testing materials for distribution over the web or on CD. Software developers use it to create working models of applications, allowing demonstration and fine-tuning of the look and feel of products that are still in development. Software publishers use it to create product tutorials. Businesses use it to create presentations, training materials and interactive catalogues that help buyers choose colours and patterns. Exhibit designers use it to create touchscreen kiosks that provide instant information for exhibition visitors.

Interactive media authoring integrates a wide variety of elements including sound, video, animation, text, quizzes and interactivity to produce a complete package which can be distributed in a variety of formats. The most common formats are CD/DVD ROM (for example those included as cover discs on magazines) though some material is also published for use on the internet. Many books also include interactive CD ROMs to supplement traditional text-based content. Interactive media authoring is also increasingly used to create educational and training products.

Interactive media products are produced using an authoring tool which allows the most common asset types to be imported and controlled. Some tools use a page and book approach to build and link screens within a product, whilst others use a timeline or score and a stage. The authoring tools will also include some form of programming or scripting to produce the complex interactivity required for games and quizzes.

Through following this unit learners will develop an understanding of the capabilities and interface of interactive media authoring software, and understand and use the main tools and features, including scripting language associated with interactive media authoring software.

Learning outcomes

On completion of this unit a learner should:

1 Understand principles of interactive media authoring

2 Be able to devise an interactive media product

3 Be able to create an interactive media product following industry practice.

Unit content

1 Understand principles of interactive media authoring

Authoring: definition; interactive media authoring tools; planning; design; development; production

Applications: uses eg entertainment, marketing, presentations, product catalogues, documentation, games, education, computer-based training, assessment

Format: web; CD/DVD ROM; information kiosks; presentations; interactive TV; handheld devices

Assets: sound; text; video; vector graphics; animations; images

Interactivity and control: buttons; events; hotspots; scripting; timelines; slideshows; effects

Limitations: size; download time; type of content; requirement for plug-ins

2 Be able to devise an interactive media product

Stimulus: eg client brief, own brief, from market research

Ideas: brainstorming; mood boards; pre-visualisation eg layout sketches, storyboards; user interface; visual style eg colour palettes, typography; sounds; animations; interactivity

Assets: existing; to be created

Legal and ethical considerations: legal eg copyright; ethical eg confidentiality, privacy, decency, libel; representation eg race, gender, religion, sexuality

Product specification: purpose (client needs, target audience, content, publishing format); aesthetic quality (visual style, layout)

3 Be able to create an interactive media product following industry practice

Planning: asset management (file storage and retrieval, naming conventions); workflow (scheduling, efficient time management); deadlines (production milestones, deliverables, quality assurance)

Workspace: panels eg stage, timeline, menu bar, toolbar, library, colour palettes, properties, preferences, help

Editing: text editing; vector editing

Use assets: objects (cast, sprites); scripts; importing; properties; file formats eg avi, bmp, png, jpeg, RealVideo, QuickTime, DVD video, aiff, wav, midi, mp3, asf

Animation: transitions and effects; timeline; animation editing

Interactivity: buttons; hotspots; hyperlinks; programming and scripting; behaviours, actions and properties eg mouse and keyboard events, video and sound controls

Testing: alpha; beta; user testing; modifications and improvements

Publishing: eg self-running presentation (projector); product medium eg CD, DVD ROM, web

Industry practice: reflect on finished product (compared with original intentions, fitness for purpose, technical qualities, aesthetic qualities); production skills (ideas generation, product specification, 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 summarise accurately the principles of interactive media authoring with some appropriate use of subject terminology	**M1** explain the principles of interactive media authoring with reference to detailed illustrative examples and with generally correct use of subject terminology	**D1** critically assess the principles of interactive media authoring with supporting arguments and elucidated examples, consistently using subject terminology correctly
P2 generate outline ideas for an interactive media product working within appropriate conventions and with some assistance [CT]	**M2** generate detailed ideas for an interactive media product showing some imagination and with only occasional assistance	**D2** generate thoroughly thought-through ideas for an interactive media product showing creativity and flair and working independently to professional expectations
P3 create an interactive media product following industry practice, working within appropriate conventions and with some assistance. [SM; RL]	**M3** create an interactive media product to a good technical standard following industry practice, showing some imagination and with only occasional assistance.	**D3** create an interactive media product 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

This unit is intended to develop an understanding of the range of practical applications of interactive media authoring such as entertainment, magazine cover discs, education and training; and the formats and platforms to which they are published (for example, PC, MAC, kiosks, handheld devices, CD/DVD, web server). Learners must be aware of the work of professional publishers within interactive media and develop knowledge of the skills and techniques associated with appropriate authoring software. They should also learn and apply the standards and design principles which are relevant to interactive media products.

Interactive media authoring integrates a wide variety of skills and knowledge: therefore this unit links to most of the other interactive media units. This unit could be covered later in the programme when learners have produced a library of assets to incorporate in their interactive media product. An alternative approach would be to use existing asset libraries.

It is suggested that teaching follows the logical pattern presented in the learning outcomes, with study of principles covered first, followed by development of a learner's own interactive media product ideas, which can be implemented using authoring software and finally published. It is recommended that learners be given a brief for the product in order to reinforce the vocational context of their work for this unit but tutors may also agree specifications with individual learners as long as the brief agreed provides scope for the learner to cover all elements of the assessment criteria.

The concepts of interactive media authoring could be taught through a mix of lectures, demonstrations, discussions and investigations of existing products; knowledge could then be applied through a variety of activities and short practical exercises. Learners must have ample opportunities to experiment with and use industry-standard software. Software demonstration and practical experimentation is best done in short sessions, each session being reinforced with small practical projects.

As this unit encourages learners to express imaginative skills, it is appropriate that some critical self-reflective practice is undertaken. This will help to develop a habit which will be of great value in any future career.

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.
Research into and demonstration of applications using interactive media authoring, noting interactivity and control.
Class investigation of common output formats.
Lecture and demonstration, with comparative research on authoring paradigms and matching tools.
Lecture and research on asset types and limitations for use with authoring tools.
Assignment 1: Interactive media authoring – what you need to know Contribution to online media careers ezine – article on principles of interactive media authoring. Learners will cover: • authoring • applications • formats • assets • interactivity and control • limitations.
Skill building using features of authoring tools including construction of interactivity and control techniques.
Introduction/review of ideas generation and planning.
Assignment 2: College promotional CD Brief from your college to create a CD to promote the college, for distribution to potential students. Task 1: ideas generation. Learners will: • consider and interpret a creative brief • generate and record ideas • find suitable assets and document their locations • consider and document the legal and ethical implications of their proposed work. Task 2: creating the product. Learners will: • compile a comprehensive development log evidencing their creative work • carry out planning activities prior to production • undertake production workshop sessions following their planned ideas • test and improve a draft version • publish the interactive product • present work and review their own interactive media production work.
Unit learning and assessment review.

Assessment

Evidence for assessment

Evidence for the achievement of learning outcome 1 is likely to comprise a combination of presentations, written reports, interactive media products, notes on production techniques and observations. Presentations must be recorded for the purposes of internal and external verification.

For this learning outcome, 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.

A final project for the unit could be used to assess achievement of learning outcomes 2 and 3, and to test the ability of learners to apply knowledge and skills and demonstrate creativity. The tutor could either produce a standard specification for all learners or agree specifications with individual learners which provide sufficient scope to cover all elements of interactive media authoring.

Learners must reflect upon their interactive media authoring work through self-evaluation and by obtaining feedback from their tutor and peers as this is standard professional practice and hence part of the process of creating an interactive media product. The reflection should identify strengths and areas for further improvement including personal skill development.

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 inclusive and the examples need not be included in a learner's work in order for that learner to achieve the exemplified grade.

For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

P1: learners at this grade will give accurate and substantially complete descriptions of the principles of interactive media authoring and how they are applied to an interactive media product. Principles to be covered are identified in unit content. 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. When describing interactive media applications, a pass grade learner might comment, 'Interactive media applications should include a variety of interactive media elements. They would normally include some form of interactivity, text and images. Video could be included depending on users having a fast enough internet connection.'

P2: learners will indicate some consideration of the client and audience needs, though this will be brief, without discussion of implications for the product. They will evidence generation of outline ideas through brainstorming sheets, mood boards or otherwise, though for this grade they will not justify choice of final ideas for implementation. 'Outline' means that ideas are sketched out roughly and without much detail. Learners will give some indication of where ideas came from or how they were arrived at, and will present some verbal or visual indication of them. They will construct a brief proposal which will outline the idea, and give some indication of what assets will be required and where those assets will be sourced. They will also show that they have taken account to some extent of legal and ethical considerations though this evidence is likely to be minimal and factual only, lacking consideration of implications for the final product.

P3: learners will produce an interactive media product to a brief agreed with or given by the tutor. It is expected that evidence will discuss planning of the product, though plans are likely to focus on the product and deal little with management of time and planning for monitoring of progress or evaluation of outcome. For this grade the product must incorporate the main interactive media features outlined in the unit content

and the product brief. It is likely that some of the assets will be obtained from existing sources though copyright should be observed where appropriate. Some features may not fully function correctly. If this is the case then these problems should have been identified and documented through the testing phase. Following industry practice, learners at this grade will discuss their own work in general terms. They will use some appropriate technical terms in their reflective comment. A pass grade learner might note, 'My interactive media product includes a variety of features including text, images, navigation, interactivity, sound and video. I am generally happy with the overall look and feel of the product. I needed to use more scripts to give more interactivity.'

P2 and P3: in terms of the aesthetic or imaginative qualities of their work, learners will not move beyond the conventional, but the conventions applied will be appropriate to the form or genre within which they are working. When engaged in practical activities, learners will 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.

M1: when explaining the principles of interactive media authoring, learners will select specific appropriate examples. The explanation will be comprehensive and appropriate terminology will be used in descriptions and explanations, with learners using technical vocabulary for the most part correctly, though they may make mistakes or be unsure about usage at times. A merit grade learner might comment, 'Product X is a good example of an interactive media learning product, incorporating good interactive features such as the interactive electrical test meter which allows users to drag the leads on to a variety of electronic components and displays appropriate results. A limitation of the design is that it requires users to have the Java plug-in installed.'

M2: evidence is likely to be a report or presentation including sketches or storyboards (or both) within a final design document presented as a final proposal suitable for use by another to prepare the product. Learners will consider the client and audience needs carefully, with some discussion of the implication of these considerations for the product. They will evidence generation of ideas through brainstorming, mood boards or otherwise and will justify their choice of final ideas for implementation. Merit grade learners will acquire assets from a variety of conventional and other sources. There will be evidence of an awareness of legal and ethical constraints, and some consideration of their implications for the final product.

M3: learners will produce a functional interactive media product. They will discuss planning of the product and for this grade plans will include management of time and planning for monitoring of progress. The final product will apply the concepts and principles of interactive media authoring with imagination. There will be some complex features such as scripting. Learners will implement the product using a wide range of interactive media authoring tools with only limited assistance required. Following industry practice, learners will explain their own work with reference to helpful illustrative examples. A merit grade learner might note, 'Following tests of my interactive media product it became apparent that the navigation was flawed as users were not able to easily locate the video section. I fixed this by making the button functions more obvious using improved labelling.'

M2 and M3: learners will show facility and some confidence in relation to skills and the handling of equipment. Work will be approached methodically and with adequate preparation, ideas will be worked out and presented neatly. Processes will be undertaken with care and, generally speaking, thought will be put into the work. Learners will still be working within recognisable generic conventions, but there will be some imaginative thought behind the work so that technical skills and codes and conventions will be employed with some inventiveness. When engaged in practical activities, learners will need little assistance, though typically they will still need some support when dealing with more complex technology or trying to apply more sophisticated techniques. Like the pass grade learner, they will respond positively to any help given.

D1: learners will justify their explanation of the principles of interactive media authoring citing precise examples. The arguments made will be clear and expressed in fluent technical language which will be used correctly and confidently at all times. A distinction grade learner might comment, 'The designers of product X have used interactivity to enhance the learning experience and test the application of knowledge by using

an electrical test meter which allows users to drag the leads on to a variety of electronic components and displays appropriate results. A limitation of the design is that it requires users to have the Java plug-in installed. However, this is justified by the high level of interactivity available which could not easily be included using alternative methods.'

D2: work will reflect near-professional standards with learners working independently to prepare a final design document, report or presentation including sketches and possibly also storyboards. This will be presented as a final proposal suitable for use by another to prepare the product. Learners will demonstrate a thorough consideration of client and audience needs which will include a reasoned and justified discussion of implications. Learners will justify the choice of final ideas for implementation. They will evidence acquisition of imaginative assets from a variety of conventional and other sources, the assets being well tailored to meet the needs of the product. There will be thorough consideration of the effects of legal and ethical constraints upon the final product.

D3: learners will produce an interactive media product of technical quality that reflects near-professional standards. For this grade, plans will include a detailed breakdown of time management for monitoring of progress. The product will implement with flair the concepts, principles and standards of interactive media authoring. A full range of authoring tools, including appropriate scripts, will be used during the production. The final product will have been fully tested with all errors detected and either corrected or identified as an area for future attention. Following industry practice, learners will critically reflect upon their own work in the context of professional practice. A distinction grade learner might note, 'I carried out tests with users from the target audience group using computers with a variety of specifications and different operating systems. Feedback and problems were logged using a standard form. In response to the feedback, modifications were made to improve performance and the product was republished to incorporate the improvements. In particular, I was pleased that the users liked the bright primary colours, which I have seen used in a lot of interactive products aimed at the younger age groups.'

D2 and D3: the term 'quality that reflects near-professional standards' does not mean the learner has to achieve actual professional standards. 'Near' means that technical and production skills are beginning to approach the professional standard – they bear comparison with it. 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 distinction grade learners will be capable of working autonomously and effectively. The term 'working independently' 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 if 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**: Interactive media authoring – what you need to know	Article on principles of interactive media authoring for an online media ezine.	all preparatory notes. article as word-processed or electronic document.
P2, M2, D2	**Assignment 2**: College promotional CD Task 1: ideas generation	Brief from your college to create a CD to promote the college, for distribution to potential students.	all ideas notes, sketches and drafts. asset audit sheet. notes on legal and ethical implications.
P3, M3, D3	**Assignment 3**: College promotional CD Task 2: creating the product	As above.	final product – the CD. creative development log. all production documentation. testing reports. personal reflective comment.

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

This unit forms part of the BTEC Art and Design suite. This unit has particular links with the following units in the BTEC Art and Design suite (NB – the links to the Level 3 units will depend upon the medium in which students are working to produce assets for this unit):

Level 2	Level 3
Working with Interactive Media Briefs	Computer Game Design
Working with Digital Art and Design Briefs	Interactive Media Design

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

Interactive Media and Computer Games

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

IM9 Provide creative and strategic direction for interactive media projects

IM10 Initiate interactive media projects

IM12 Devise and evaluate user testing of interactive media products

IM13 Conduct user testing of interactive media products

IM15 Write and edit copy for interactive media products

IM16 Plan content for web and multimedia products

IM17 Architect interactive media products.

Essential resources

For this unit learners will need access to appropriate hardware and authoring software of industrial standard, software manufacturers' manuals, textbooks, and a range of examples that illustrate current interactive media authoring.

Employer engagement and vocational contexts

Centres should develop links with local interactive media production studios which could be approached to provide visiting speakers, study visits or samples of typical products.

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 Encore DVD 2.0 (Classroom in a Book)* (Adobe, 2006) ISBN 978-0321267955

Austin T and Doust R – *New Media Design* (Laurence King Publishing, 2007) ISBN 978-1856694315

Barron A E and Ivers K – *Multimedia Projects in Education: Designing, Producing and Assessing* (Libraries Unlimited Inc, 2005) ISBN 978-1591582496

Bellune J – *The Focal Easy Guide to Adobe Encore* (Focal Press, 2006) ISBN 978-0240520049

Chapman N and Chapman J – *Digital Interactive Media* (John Wiley & Sons Ltd, 2004) ISBN 978-0470858905

Howell W – *DVD Authoring with Adobe Encore DVD: A Professional Guide to Creative DVD Production and Adobe Integration* (Focal Press, 2004) ISBN 978-0240805634

LaBarge R – *DVD Authoring and Production: An Authoritative Guide to DVD-Video, DVD-ROM, and Web-DVD, DV Expert Series* (CMP, 2001) ISBN 978-1578200825

Schaeffer M – *Macromedia Director MX 2004 for Windows and Macintosh: Visual Quickstart Guide* (Peachpit Press, 2004) ISBN 978-0321246677

Underdahl B, Nyquist JR and Martin R – *Macromedia Director MX 2004 Bible* (John Wiley & Sons Ltd, 2004) ISBN 978-0764569906

Vaughan T – *Multimedia: Making it Work, 6th Edition* (McGraw-Hill, 2003) ISBN 978-0072230000

Websites

www.digitalworkshop.com – multimedia authoring tools for business

www.hyperstudio.com – authoring tools for project-based learning

www.macromedia.com – the Adobe website

www.matchware.net – presentation software developers and suppliers

www.mcli.dist.maricopa.edu/director/index.html – archived list of tips for Director

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 ...
Creative thinkers	generating ideas for their interactive media product
Reflective learners	reviewing and reflecting on their interactive media authoring work and acting on the outcomes to modify and improve their work
Self-managers	organising time and resources and prioritising actions whilst generating ideas, sourcing assets and preparing a proposal, and when creating their interactive media product, whether working on their own or in a group.

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 ...
Independent enquirers	carrying out research into principles of interactive media authoring and its application carrying out research to develop ideas for their own interactive media product
Team workers	if working in a group to produce an interactive media product, taking responsibility for their own role managing their personal contribution to and assimilating information from others in discussions to reach agreements and achieve results.

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 interactive media authoring systems to author their product
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	planning for the authoring of an interactive media product
Manage information storage to enable efficient retrieval	managing assets sourced and created for their interactive media product
Follow and understand the need for safety and security practices	handling interactive media authoring systems to author their product
Troubleshoot	handling interactive media authoring systems to author their product
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	sourcing assets for their interactive media product
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching asset types and their limitations for use with authoring 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 their brief and their generation of ideas, documenting the management of their chosen assets, considering legal implications and reviewing their own work
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 interactive media authoring tools and how interactive media authoring is 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 authoring 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 screen layouts using estimation and calculation to work out timings for editing of sound or video clips for integration into their product
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 as a response to a creative brief
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	studying manufacturers' manuals to research interactive media authoring software
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	creating their project portfolio incorporating ideas, notes, production documentation, testing reports, and reflective comment.