



Australian Government

Department of Education, Employment and Workplace Relations

ICAGAM521A Create interactive 3-D environments for digital games

Release: 1

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Modification History

Release	Comments
Release 1	This Unit first released with <i>ICA11 Information and Communications Technology Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to create interactive 3-D environments for digital games.

Application of the Unit

This unit applies to concept artists, game designers, games programmers, animators and other personnel working in the game development industry.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

Elements and Performance Criteria

1. Obtain design documents for the 3-D environment	1.1 Conceptualise design requirements based on project brief and other relevant documents 1.2 Identify requirements for the design of the 3-D environment 1.3 Discuss design considerations and generate concept art for the final environment design 1.4 Fill in any missing requirements
2. Identify software tools that can be used to create 3-D environments	2.1 Identify texturing tools, including painting, shading and texturing software 2.2 Identify audio tools 2.3 Identify 3-D modelling and animation software to be used
3. Document and justify the design decisions	3.1 Clearly document design decisions 3.2 Explain and justify design decisions 3.3 Make changes where necessary
4. Create the 3-D environment	4.1 Implement basic geometry, flow and layout 4.2 Separate each section of the environment into key parts and choose a focal point for the environment 4.3 Incorporate detail into the focal point of the level 4.4 Use the focal points level of detail to set a target for the rest of the environment 4.5 Integrate the geometry, texturing and place the models 4.6 Carry out a detailed pass of the entire environment 4.7 Set up exterior lighting and then interior lighting 4.8 Incorporate any sound and particle effects, and perform optimisation if required 4.9 Perform a final pass, finalising any elements
5. Present the finished 3-D environment to relevant personnel	5.1 Present the finished 3-D environment to relevant personnel 5.2 State how the design decisions have met the 3-D environment design requirements 5.3 Justify why certain design decision where made 5.4 Accept peer feedback and incorporate in final design

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- analytical skills to:
 - analyse documentation and images to inform game specification creation
 - interpret briefs, work instructions, and technical and conceptual information
- communication skills to:
 - check and confirm design requirements
 - collect, interpret and communicate in visual and written forms effectively for various audiences, including engineers and artists
 - communicate clearly using speech and text
 - communicate complex designs in a structured format drawn from industry standards, styles and techniques
 - communicate technical requirements related to software development, graphics requirements and code development to supervisors and other team members
 - contribute to and work in a collaborative team
 - give and receive constructive feedback
 - provide practical advice, support and feedback to colleagues and management
- planning and organisational skills to:
 - appropriately refer decisions to a higher project authority for review and endorsement
 - delegate tasks and responsibility appropriately
 - establish clear roles and goals to achieve required game development outcomes
 - meet project deadlines
 - organise equipment and resources to achieve required outcomes
 - organise own time to meet milestones
 - prioritise work and meet critical milestones and deadlines
- problem-solving skills to recognise and address potential quality issues and problems at design development stage
- research skills to undertake practical, technical or desktop research into design requirements and software tools
- technical skills to:
 - realise a unified game-play vision
 - resolve basic hardware, software and other technical issues associated with game production
 - translate design requirements into specifications
 - use correct file formats and archiving procedures
 - visualise and develop concepts.

Required knowledge

- budgeting and scheduling considerations for game design
- capabilities and constraints of game engines
- computer game development, including specific terminology

- current game-play hardware and software products
- human resources required in the process of creating a game and their respective skills and technology requirements
- technical constraints that hardware imposes on software development, graphics requirements, code development and creative visual design.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • implement design requirements into a working 3-D environment • create interactions between the user and the environment • manage design requirements with technical requirements • deliver a 3-D environment with working interactions.
Context of and specific resources for assessment	Assessment must ensure access to: • computer hardware, software, games engines and file storage • copyright and intellectual property legislation • OHS legislation and enterprise policy • appropriate learning and assessment support when required • modified equipment for people with special needs.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • evaluation of: • production of a 3-D environment with interactions • response to fault-finding exercises • simulated workplace activities • work samples • written or verbal questioning to assess knowledge of interactive environments • review of: • logbooks • presentations • reports.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate. Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the

	work being performed. Indigenous people and other people from a non-English speaking background may need additional support. In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.
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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<i>Project brief and other relevant documents</i> may include:	• concept drawings • designer's notes • development environment description • level design document • storyboard • style and design principles • style and medium • target market information • technical design document • technical design review process.
<i>3-D environment</i> may include:	• characters and environments, such as: • backgrounds • environments • lighting • scenery • terrain • textures • environment profiles, such as: • alien • fantasy • foreign • historical • naturalistic: • arctic • desert • jungle • mountainous • post-apocalyptic • urban • game design, such as: • concept illustrations or graphics that enhance the comprehension of the document • design for all level missions

	• game mechanics that affect level design decisions • illustrations of level with all significant points of interest • introduction and overview (one page synopsis) • key selling points, including intended audience, genre and platforms • production details • scripts required for level • synopsis and scripts for each level • title and cover art (art must be colour and of a reasonable resolution for high quality printing) • walk through for at least one mission or level • game genre, such as: • adventure • alternative reality • ancient • casino • cyberpunk • educational • edutainment • fantasy • first person shooter • flight shooter • flight simulation • futuristic • god simulation • massively multi-player online game • massively multi-player online role-playing game • medieval • modern • multi-player • post-apocalyptic • puzzle • racing shooter • racing simulation • real-time strategy • role-playing game • science fiction • side-scrolling shooter • single player • sports
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	• strategy, including action strategy and turn-based strategy • tactical combat • game mechanics, such as: • lists and illustrations of: • actions of a particular object (object dynamics) • environment actions (environment dynamics) • game objects organised into classes of object • possible environment and object interactions • possible object-to-object interactions • specific game-play elements that provide uniqueness and key point of difference • overview of the key factors influencing core game-play experience • game physics, such as: • collision • combat: • blood spots • debris • explosions • footprints • salvo • smoke and fire • sparks • water • wreckage • movement: • creaking floors • footfalls • puddle stepping • wading • wind • game-play elements, such as: • buildings • game flow • switches • terrain objects • transformations • transportation • traps • level specifications, such as:
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	• level-specific components: • allies • base building and location • cinematic, such as cut scenes • colours • enemies • graphics • health • lighting • non-player characters • resources and their harvesting • sounds and music • weapons • location • stages • transportation devices: • buttons • doors • keys • teleporters • tunnels and passageways.
Design considerations may include:	• aesthetics • cultural context • genre • resource limitations and constraints • target market.
Concept art may include:	• illustrations • models • settings • sketches • storyboards.
Painting, shading and texturing software may include:	• 3-D paint • Illustrator • Mudbox • Photoshop • ZBrush.
3-D modelling and animation software may include:	• 3ds Max • Blender • Cinema 4D • Houdini

	• Lightwave • Maya • Modo • XSI • Z Brush.
Personnel may include:	• animators • concept artists • game-play designers • graphic designers • instructional designers • modellers • motion capture technicians • other specialist staff • other technical staff • producers • programmers • project manager • sound engineers • team members • technical director • writers.
Feedback may involve:	• accepting and responding to comment, critique and suggestions from: • clients • colleagues • target audience representatives.

Unit Sector(s)

Game development