3D Digital Game Art

WorldSkills Occupational Standards

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WorldSkills Occupational Standards (WSOS)

Occupation description and WSOS

The name of the occupation is

3D Digital Game Art

Description of the associated work role(s) or occupation(s)

The games development sector comprises three occupations or work roles: the designer, the artist, and the programmer. The 3D Digital Game Artist takes a designer's brief and, through a combination of conceptualization, creativity, selectivity, technical, and specialist skills, completes the brief to the satisfaction of clients. The 3D Digital Game Artist receives, conceptualizes, and interprets design briefs on the basis of their market knowledge and skill sets, and the given scope and limits of the briefs. The skills required of the 3D Digital Game Artist can be broken down further into 2D concept art, texture painting, 3D modelling, rigging, and animating.

After interpreting a brief, the 3D Digital Game Artist must produce a 2D digital concept of the required assets for the game, which could include objects, characters, and environments. This requires the development of good silhouettes enabling the designs can be recognized immediately without detail, with greyscale values that highlight the important details of an asset, in order to define a colour scheme based on the Artist's knowledge of colour balance, saturation, and mixing.

The 3D Digital Game Artist must then produce a 3D mesh of the asset, making decisions for geometry, triangle count, symmetry, and silhouette, and modelling the edgeflow. UV unwrapping is used to flatten a 3D model into a 2D set of shells that a texture can be painted onto. This requires the ability to assign enough 3D mesh from the model for the model to render enough detail. The placement of the UV shells is a meticulous job. Artefacts must take into account the bleeding effect of colour on smaller versions of textures dependent on hardware, so these shells should be grouped by base colour.

Textures are then produced to create materials that may be applied to the 3D model, taking into account the colours, secularity, and opacity of various parts of a model. Some textures are painted by hand; some require the use of photographic references and others require a digital process to calculate ambient occlusion and normal maps for shadows and detail. Next, the model may be rigged with bones in the 3D software in order to animate it either in the 3D software or the games engine.

An artist may work in a team led by an Art Lead or Director, or in small companies with a programmer and designer. Artists may work in open areas for creative sharing, or in isolation on a strictly confidential basis.

Despite tremendous growth in the sector, the 3D Digital Game Artist's role has evolved and split into specialisms, but otherwise remained constant, with an ongoing appreciation of aesthetics, colour, structure, and form as well as movement. The best artists are able to lead art teams solving visual errors and producing assets that operate on the fringes of the available technology to achieve the most absorbing experiences possible in a videogame.

General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the "weighting". The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

WorldSkills Occupational Standards

Section	Relative importance (%)
1 **Work Organization and management**	**5**

The individual needs to know and understand:

- Regulations and requirements for safe working practices
- Terminology specific to the sector and role
- How to plan for and manage time and tasks
- The importance of making regular backups of work to avoid file corruption
- File management and structure for interpretation by the team and for optimal use when transferring between hardware

The individual shall be able to:

- Conform to professional standards at all times
- Take responsibility for all production processes
- Set-up and maintain file structures and naming conventions
- Manage their own time
- Recover from setbacks
- Communicate and work with others for the common benefit

Section	Relative importance (%)
2 **Interpretation of the design brief**	**6**

The individual needs to know and understand:

- The 3D digital game market
- Art styles and how to read and work to a particular set style
- Platform specifications and the restrictions and opportunity they afford to polygon counts and texture sizes.
- Asset list priorities to determine what are the most important assets to spend time on and what can utilize duplication/re-use.

The individual shall be able to:

- Conform to the art style, colours, and themes
- Select appropriate approaches based on platform, genre, audience, and game type.
- Produce asset lists and determine timescales, polycounts, and texture sizes

Section	Relative importance (%)
3 **Concept art**	**12**

The individual needs to know and understand:

- The creation of silhouettes of objects and characters to portray shape, mood, mass, and movement.
- Values of greyscale to draw viewers' attention to important aspects of the asset
- Colour theory for choosing base colours, secondary, mixing, and balance.

Section	Relative importance (%)

The individual shall be able to:

- Digitally paint to demonstrate form, line, shading, perspective, proportion, light, and shadow.
- Use digital techniques to produce appropriate effects and make efficient use of time
- Choose appropriate software to paint concept art pieces in with maximum production in the swiftest time
- Review and select each piece of concept art to inform the look of finished 3D models

4	3D Modelling	28

The individual needs to know and understand:

- Geometric principles in determining how to build the assets
- Symmetry in creating a base model that allows for efficient use of materials later on in the process.
- Polygon counts that are proportional to detail and focus on the asset/s.
- Edgeflow that evenly distributes vertex points over models for a balanced texel density and even silhouette.

The individual shall be able to:

- Select appropriate 3D modelling software to begin models, e.g. 3DS Max or Maya for hard surface modelling, or a sculpting tool like ZBrush for organic sculpts.
- Utilize skills in sculpting, edge modelling, or box modelling to produce the basic form of models
- Use tools and modifiers to create further details on models
- Constantly review models from all angles to determine refinements, improvements, and additional detail
- Use optimization techniques on the models

5	UV unwrapping	10

The individual needs to know and understand:

- Mirroring shells to maximize texture space and texel density.
- Equitable proportions for important sections of assets.
- The spacing of shells that maximizes the usage of texture sheets while avoiding colour bleeding between shells
- The grouping of shells by colour to further avoid colour bleeding

Section	Relative importance (%)

The individual shall be able to:

- Use UV unwrapping tools to project maps on to all the surfaces of 3D assets
  Separate surfaces into appropriate shells to flatten over the UV space.
- Organize shells to make the most of space
- Group shells with similar colours together
- Export UV coordinates to texture tools or painting software
- Bake UV from 3D assets

6	Texturing	20

The individual needs to know and understand:

- How to paint colour and details to represent a variety of physical materials like wood, plastic, metal, and fabrics
- Diffuse colour maps that represent the base colours of materials
- Specular maps that represent shine in order to produce realistic metal, plastic, or wet and oily surfaces.
- Opacity maps that use alpha maps to produce complex objects on a 3D flat plane, e.g. grass, hair, branches, wire.
- Normal maps and the production of high-resolution models, to project, using cages onto low resolution models
- Ambient occlusion that uses the 3D information to render shadows onto flat texture based on the proximity of polygons

The individual shall be able to:

- Select an appropriate piece of software to produce textures and materials e.g. Photoshop and Substance Designer
- Paint a variety of physical materials and adapt to the art style set out in the brief (e.g. hand-painted and/or PBR)
- Paint or engineer specular maps for controlling shine and glossiness of surfaces
- Paint opacity maps, as required, to handle complex objects or sections of assets
- Export a variety of maps (normal, specular, ambient occlusion etc) from appropriate pieces of software and import into the preferred 3D software

Section	Relative importance (%)
7 **Rigging**	**13**

The individual needs to know and understand:

- The purposes and construction of bones to move 3D models in a games engine
- Forward kinematics and inverse kinematics
- The tool to set up appropriate IK chains with relevant constraints.
- The purposes of skinning, and methods for skinning a model
- The purposes of key frame animation
- How to make animation into the asset

The individual shall be able to:

- Create an appropriate bone structure to form a working rig for the in-game asset.
- Set up a parent child structure for FK or IK chain.
- Skin the mesh and paint how the bones influence the 3D model.
- Set simple animation keys to test the motion of the asset in an engine

Section	Relative importance (%)
7 **Export to game engine**	**6**

The individual needs to know and understand:

- How to utilize material shaders and lighting to represent assets and their most important aspects.
- The correct set up for export files to import them to game engines
- The options for importing files, based on the selected game engines
- How to test the asset once in a game engine

The individual shall be able to:

- Choose and use a renderer, pose the object, and select appropriate lighting and settings to highlight the best qualities of the asset
- Export 3D models and rig/animation into a games engine.
- Select an appropriate game engine and test the asset for model, UV, and deformation errors.

Total	**100**

References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (http://www.ilo.org/public/english/bureau/stat/isco/isco08/) ILO 2166
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.**onet**online.org/)

This WSOS is closest to Multimedia Artists and Animators:
https://www.onetonline.org/link/summary/27-1014.00,

and also to
Digital Artist: http://data.europa.eu/esco/occupation/d5c4ab26-c293-4f4d-ad89-fe776f49a67f.

These links can also be used to review adjacent occupations.

There were no responses to the requests for feedback this cycle.