ASSESSMENT REPORT

CGD315118 COMPUTER GRAPHICS AND DESIGN

FOLIO

Candidates and teachers must read the published TASC project guidelines to ensure submitted projects conform to these requirements. Overall presentation and documentation of design folios was generally sound. It is important to make sure font size of written text is not less than 11 point size and in an easy to read font format. The use of many different font types and type on backgrounds that make the text difficult to read are not good design practice in terms of effective visual communication. Some folios were again difficult to assess due to their lack of consistency in their presentation format. It is much easier to assess a folio where the structure is: brief, precedents/research, concept development, production, final project, essay plan, industry essay and evaluation. It is also advised to add a cover page with the project title, the candidate’s TASC ID number and an image of the final design.

"Contemporary design" is a key requirement for a design folio. A very small number of projects lacked an understanding of the meaning of "contemporary design". These had military or medieval themes and were not examples of "contemporary design" unless there was an explicit connection to design contexts such as interactive game environments. In many instances such projects also lacked a maturity in design thinking as do projects that include things such as blood and overt themes of violence. Highly successful projects again illustrated a completeness in terms of the design process in addressing the folio criteria. A small number of candidates continue to confuse quantity over quality by exceeding the 40-page limit in their folio as set out in the project guidelines. It is better to undertake a smaller and less ambitious design project and do it well rather than undertake a design project that is clearly too ambitious for the designated 50-hour design time and the student’s capabilities. In such circumstances the folio and project often lacked finesse in the design development and resolution.

The writing of a coherent and correct design brief continues to be a weakness for several folios. The design brief is the foundation of the design project and must have a reference to the context or main design idea, the anticipated target audience, functional intentions and intended methods of presentation of the project outcome. It is good to invent a design scenario with an intended “client”. Students who had a well written design brief in almost all cases achieved a successful and coherent design project outcome. This should ideally be written as a set of coherent paragraphs to introduce the project’s design intention. Setting out to produce a project with the lack of a design intention or one that is largely one of replication does not meet the basic learning goals of the course.

The research or precedents phase of the project design process is a critical step in the analysing of the project brief and is a foundation for further design development. Stronger projects had well researched precedent content that was well annotated, well connected and analysed with design language to the design intention of the brief. This assisted in developing strong design solutions. Several candidates continue to not understand the importance of this phase of the design process with poorly articulated precedent research that lacked a clear connection to the design brief and an inadequate reflection of design elements and principles. Many candidates could look wider than just relying on web searches for
design inspiration. Taking their own photos of buildings, products, logos etc. is encouraged as is seeking inspiration from printed books and magazines.

Exploration and experimentation by design sketching, be it with pencil or with digital tools, is a critical part of the design process. It provides opportunities for students to fully develop an understanding of their design intention before the production phase and to fully explore appropriate application of design principles and elements. Stronger candidates clearly demonstrated the capacity to explore and experiment with ideas. They also demonstrated a process of reflection and refinement in order to achieve a coherent final design solution in readiness for the production phase. These design sketches were well annotated, communicating effective design thinking. They provide a clarity of what needs to be done when the computer graphics is produced. A significant number of candidates did not produce design sketches to the standard expected of the course. These were often poorly annotated and did not conform to visual communication standards. For example, orthographic or multi-view representations should be set out according to standard layout conventions for such representations. Candidates need to provide evidence of the evolution of the design idea and not just focus on one idea. A few candidates also needed to enhance the scans of their design sketches to make them more readable in their folio.

Design sketching is a skill that needs to be explicitly practised by candidates and taught by teachers. A good test of whether a design has been fully/adequately resolved is that an examiner or a third party should be able to produce the design from the material provided with appropriate computer graphics tools. In some circumstances it was apparent that design sketches had been done after the event. In all cases these projects were poorly resolved as a final design because they lacked a clarity of design intention.

Most candidates provided annotated screen grabs of their production process with appropriate annotation and commentary that communicated terms and vocabulary relating to computer graphic based content generation. These are critical in proving the authenticity of the student’s work. No screen grabs of the production process or ones with little or no specific commentary relating to actual processes do not provide the required evidence of authenticity of student generated computer graphics.

It is important that candidates apply correct computer graphic production processes. Most candidates applied both appropriate compression codecs and contemporary aspect ratios in animations. Selection of appropriate image resolution of completed design content is an important consideration as is fully resolved design outcomes. High level projects demonstrated skilled application and production of digital content across a diversity of contexts. It is good to see projects that are series of still images put into a video type presentation format as this provides a more coherent method of displaying the candidate’s design outcomes. Adding suitable music or sound effects also enhance animated content.

Video based with no student generated digital design content, web layout type, logo based and some types of game-based projects often lacked the required Computer Graphic content to satisfactorily meet criterion 8. Such projects should be avoided unless the candidate is prepared to add a significant amount of student generated digital content.

The industry analysis essay was well completed by many candidates and made the connection between the design context of the project and computer graphics related design and production methods. In addition, several candidates also discussed relevant social and environmental contexts relating to their project areas. Unfortunately, there continues to be several candidate essays where this connection is absent and where there is a just a discussion of the industry area of the project without any connection to a computer graphics and design context. It was pleasing to see less instances where essays were more a first-person commentary of the student’s own design process. The industry analysis essay should be in an academic essay format with correct referencing in the preferred Harvard format and of the required word count.
Most candidates applied appropriate academic integrity principles in their folios with correct referencing of content sources in both the folio design process and in the industry analysis essay. Several students did not understand correct referencing requirements. A web link without additional reference such as the source and date of access is not a correct reference nor is a reference to a Google or Bing image search result. Imagery and content used in precedents or initial design research should be referenced in the project documentation using in-text referencing against the sources as well as listed at the end of the project folio documentation. The 2019 Project Guidelines were quite specific stating "Students will be penalised against criterion 5 if referencing conventions are not appropriately used."

Many candidates produced a sound evaluation/reflection of their design outcomes in response to their design brief. This is an important step in the design process to reflect upon learning and the process. Candidates who did not provide such an evaluation/reflection had an incomplete design process.

Approximately 4% of candidates presented folios that would be considered exemplars that achieved the highest possible ratings. These folios were strong with the design process and illustrated a high-level application of the principles and elements of design associated with the selected design context. In summary a high-level folio shall contain:

- a design brief that clearly articulates the design intention, context, functional considerations and potential target audience
- comprehensive annotated research of precedents connected to the design intention of the project brief
- an exploration, experimentation and evaluation through design sketching of a diversity of ideas leading to a clearly resolved final design intention
- annotated screen grabs of the production process that effectively communicate insight and understanding of the computer graphics techniques and processes used
- an industry analysis essay that makes the link between the design context and computer graphics processes that conforms to TASC academic integrity requirements
- an evaluation/reflection that reflects the learning and outcomes of the design intention
- a complete and resolved project that applies a diversity of appropriate computer graphics process and conforms to industry standards of the design context with correct referencing of content sources not generated by the student.

EXAM

Question 1
This question was attempted by many candidates. Most were able to interpret figure 1 and were able to discuss additional effects and animation principles which should be used in the animation sequence. Stronger answers discussed how these effects and principles could appear on the animation time line in terms of key frames, tweening, layers, frame rate, easing and other timeline properties.

Question 2
This was generally a well answered question. Most had a good understanding of Boolean operations. Weaker answers were unable to list and describe 3 Boolean operations or were unable to name them appropriately. Many were able to effectively describe union, subtraction (difference) and intersection. Stronger answers used correct terminology in their descriptions including referring to the objects as operands and discussing the objects in terms of their volume and geometry, strong answers also included an annotated sketch of one Boolean object which could be created from the objects in figure 2.
Question 3
This question was selected by very few candidates. Plotters have not been part of the production cycle in computer graphics in the life of candidates so little understanding was drawn from the question. Better candidates who responded to the question identified and described the use of large format printers and high speed copiers with colour copying capability and in a few instances also mentioned 3D printers as a contemporary method of producing “printed” output of digital content.

Question 4
This question was popular with candidates. Better responses mentioned the use of retopologising the geometry into four sided polygons, the addition of a subdivision surface modifier to add levels of detail, the application of various texturing methods to highlight more the form of the “bird” geometry and using lighting techniques in conjunction with texturing to add “realism to the “bird” form. Many candidates did not specifically describe actual 3D production techniques and made broad generalisations or cited a single technique.

Question 5
This question was selected by a majority of candidates and generally answered at a competent level. Most answers focussed on use of appropriate resolution settings, use of lossless compression algorithms and methods of exporting files that avoid loss of detail.

Question 6
This was a popular question that was frequently answered to a good standard. Candidates answering this question generally identified vector graphics as being derived from mathematical equations expressing the location of start points, mid points and end points of lines and curves. Answers invariably commented on vector graphics being infinitely scalable without loss of quality. Many answers commented on the suitability of vector graphics for logo design and referred to software platforms that utilise vector graphic methods. Answers also referred to the relationship between vector graphics and 3D polygon modelling.

Question 7
Candidates were generally able to articulate the difference between CPU and GPU. A common response was that the CPU was the “brains” of the computer as it can do everything, and quality responses discussed that it was a collection of millions of transistors that perform a variety of calculations. The GPU optimises the graphic display and performed very specific computational tasks such as video rendering which was discussed by many candidates.

Question 8
Very few candidates attempted this question, and few were able to effectively articulate the process of producing a physical 3D model. Several responses lacked understanding of what and how a CNC machining operates. Stronger responses discussed the process of taking 3D model data from a CAM program which controls and monitors the movement of the machine along a X, Y and Z axis.

Question 9
This was a popular question with candidates, but many responses struggled to do more than state that the “evolution” of design was the case by repeating the question statement with vague generalisations to support the proposition. Better responses identified and described how technological advancements in production techniques and materials, changes in social and environmental values, varying fashion trends and changes in needs of contemporary living impact on design.
Question 10
Candidates who responded to this question did so with insight and understanding. They, in the main, identified that the traditional icon representation of wheelchair based people suggests a lack of mobility and a lack of social inclusion, and provided sound arguments as to how the more contemporary icon representation promoted the ideas of inclusivity, mobility and social capacity in contemporary society.

Question 11
Although a popular question, the general standard of answers was mediocre. Many candidates failed to define the concepts of “form” and "function", often simply stating that they are important aspects of the design process and that quality designs require attention to both these concepts. Higher quality answers commenced by defining the concepts and articulated relevant examples that compared and contrasted these elements within one or more example products. Higher achieving answers identified the notion that “form follows function”. In other words, the proposed function of the object is the reason for it being created and that the form, while very important, is usually considered after functional requirements of the product are met.

Question 12
Another popular question that produced relatively few high standard answers. Many answers failed to go beyond identifying the key elements of the question, often adding minimal new material to the discussion. Higher standard answers looked at reduction in the use of plastics in packaging as well as reducing the use of single use plastic products (straws, coffee cups etc.). Other answers considered promoting use of recycled materials in the products manufacture as well as manufacturing products from materials that are readily recycled at the end of their service life. Customer participation in the design and recycling processes featured in some answers. While many answers alluded to the use of bio-degradable materials, some candidates highlighted their concern that many such products do not entirely decay in the environment but become “micro-plastics” that can easily be ingested by wildlife.

Question 13
Candidates were generally able to draw on trends from previous eras and how they have shaped and influenced new designs; however, there were few high-quality responses. Strong responses included discussion on specific style elements allowing a direct link from vintage design to how new design are now perceived.

Question 14
This was a popular question which yielded few quality responses. Strong responses discussed the improved visualisation of the finished building, the ability to check for errors, provide virtual tours and walkthroughs, calculate shadows and apply realistic materials. Disadvantages discussed the time and cost to create the 3D model and the time required to render a walkthrough animation.

Question 15
This question was generally well answered. Weaker answers focused on the differences between the two mice and vaguely touched on ideas behind the need for change in design over time. Stronger responses were able to discuss the changes in need and how the design of the mice responded to the changes in need. Many students identified the need for a more ergonomic design as people started to use computers for longer periods of time. Other identified needs included an increasingly interactive on screen user interface and a move away from keyboard commands which meant the mouse required more functionality. The need for mice to become more portable as other computer technology became more portable reflected in a more lightweight and compact cordless design incorporating a laser to detect movement instead of a ball. Finally, improvements in technology and manufacturing techniques, which enabled the mouse to achieve the above mentioned changes in design.
Question 16
This question had few quality responses. Weaker answers listed some external factors but didn’t describe them or described one external factor in vague terms. Many students provided an example of an external factor that may have been relevant to a specific product but wasn’t relevant to the design of products in general. Stronger answers were able to list a broad range of external factors and describe them concisely in the context of product design.

Question 17
Very few candidates attempted this question and few were able to effectively communicate how the exoskeleton helped people with physical challenges. Many students presented rudimentary designs based on an existing idea with little or no consideration for form or function. Support sketches and annotations lacked ergonomic considerations, detailed structural design or material selection.

Question 18
Few candidates attempted this question and few were able to provide effective insight into how unmanned aerial firefighting systems could functionally be used to fight fires. Many did not understand the functional challenge of using water born carrying system in small drones. Better responses identified and described the need for fire proof materials, the use of cameras for guidance, remote sensing and operation from a remote location, the need for robust large unmanned firefighting payloads with fire retardant systems to assist in firefighting and the social considerations of such systems when they incorporate camera based technologies. Some responses also identified and described how such unmanned systems could play an important role in identifying and observing “hotspots” using remote sensing technologies for the on ground intervention of firefighting teams to reduce the possibility of such teams being caught in life threatening situations.

Question 19
This question had a range of responses. The question was typically interpreted in one of three ways. To design food packaging for pre-packaged foods, take away foods or food prepared at home. Stronger answers identified the needs of the consumer and the environment in relation to the packaging type. They discussed how the product would fit with the idea of reuse, recycle and reduce and the importance of the choice of material in terms of its environmental impact from production to disposal. Weaker responses didn’t have a good grasp on the environmental challenges created by our reliance on plastics and/or had a weak connection between their discussion and design. For example, mentioning that material was important but not identifying their choice of material through their annotations or discussion. Some answers focused on the branding and marketing of a product as environmentally friendly rather than on the design of the product itself.

Question 20
This question was attempted by relatively few candidates. Quite a number overlooked the requirement to produce a 3D design drawing. Higher achieving answers were thoroughly annotated with comments describing the functional requirements of the design. More competent answers feature isometric and perspective drawings of compact living spaces featuring transportable living pods, some of which were based around the concept of “tiny homes” and shipping container designs. Many answers listed an appropriate range of societal considerations including addressing homelessness, consequences of family violence, housing affordability, provision of communal bathrooms, kitchens and outdoor recreational spaces and the need for energy efficiency (including rainwater collection, solar power, insulation and harnessing natural light).
Question 21
This was a very popular question producing a broad range of answers. Higher standard answers typically commenced with a definition of 3D printing and a comment describing typical 3D printing processes. These answers focussed on common 3D modelling programs, conversion to appropriate file types (e.g. .stl format) as well as discussing typical material types such as PLA and ABS. Discussion often covered the differences between entry level 3D printers and high end industrial quality printers that are capable of printing in a variety of materials including metal alloys. A few of the higher achieving answers commented on the notion that 3D printing has enabled a partial shift from mass production to mass customisation, especially in areas such as medical applications (prosthetic devices, 3d printed casts and even bio printed organ manufacturing). Most candidates agreed with the notion that 3D printing has, in various ways, changed the world.

Question 22
Very few candidates answered this question. Those who did had a good understanding of putting graphic design in motion by outlining the software techniques available such as motion blur, key framing, camera shake, visual effects tools, lighting and reflection in 3D modelling. Strong answers referred to advertisements using CG generated vehicles as a cheaper option than filming an actual car due to motion graphics being able to communicate in a way that other traditional videos production techniques cannot.

Question 23
This question had a range of responses, although very few candidates answered the question to a high standard. Most candidates answering this question had a basic understanding of what interactive design is and good knowledge of computer games. Weaker responses had a poor essay structure and described in detail moments in computer games where the player could interact with the game and how this could alter the outcome of the game. Stronger answers included an introduction, conclusion and an opening paragraph which outlined what interactive design is. Very few students were able to describe and name specific characteristics of interactive design, but stronger students were able to discuss examples of different characteristics and how these were applied to different games or technologies used by games, like VR, AR, Console etc.

Question 24
This question was answered by a small number of candidates. Better responses described in detail the workflow of setting up a base skeleton structure using a bones system, either as a custom rig or using an in-built system in many 3D applications designed for such animation. They also described how such rigging systems use a combination of inverse and forward kinematics to control the rig. They also described when the underlying rig is connected to the human model, techniques such as weighting of the geometry being needed to ensure the underlying rig affect only the required part of the model geometry. The description of systems such as motion capture and/or custom animation was in general well described to produce the animation, along with the addition of texturing and lighting to reach the point of final render output.

Question 25
This question was well answered by a small number of candidates. Students with a strong background in 3D modelling were able to articulate detailed modelling techniques, tools and processes. A diverse range of applications for each modelling techniques were discussed ranging from low poly game assets to human facial features with a high polygon count.
Question 26
This question was well answered by many candidates who attempted it. Higher level responses described the importance of using high resolution and low resolution assets to interact with level of detail (LOD) systems to respond to the game environment, how cut scenes and main interface components largely employ higher resolution assets, how compression systems are used to incorporate audio effects and how the hardware being used in playing a game drives the ability to cope with higher resolution assets. Better responses also described how different type of assets and their resolution are depended also on the style of the game design, be it “realistic” 3D or more “toon” or “sprite” like.