Design and Technology

2011 Assessment Report

Government of South Australia

SACE Board of SA

DESIGN AND TECHNOLOGY

2011 ASSESSMENT REPORT

OVERVIEW

Assessment reports give an overview of how students performed in their school and external assessments in relation to the learning requirements, assessment design criteria, and performance standards set out in the relevant subject outline. They provide information and advice regarding the assessment types, the application of the performance standards in school and external assessments, the quality of student performance, and any relevant statistical information.

SCHOOL ASSESSMENT

Assessment Type 1: Skills and Applications Tasks

Specialised Skills Application

The intention of this assessment type was to either equip students with knowledge and understanding to complete the design and eventual realisation of products in Assessment Type 2, or to provide an enriching, broader skill set not necessarily related to the product. Many examples of both were evident this year, and both were equally successful.

Successful students undertook tasks that enabled them to provide evidence of sophistication. In general, student achievement against the respective performance standards in this assessment type was pleasing, as there was strong evidence to support accomplished use of materials and equipment, and the inclusion of mastery in the completed practical processes. The evidence provided was typically in the form of annotated images and full and complete mark sheets for each student. It was important that this evidence was sufficiently detailed to support the grade given by the teachers. In some cases video evidence was supplied. These often took the form of screen-capture AVI presentations, and they were most prominent in the digital technologies such as CADD, CAD/CAM, and photography. When carefully scripted, these files provided clear and efficient succinct evidence against the assessment design criteria.

Teachers prepared students for success by providing them with tasks that had followed sound teaching and learning experiences, and that contained enough rigour to enable the potential for all levels (including the highest) of student engagement with the performance standards.

Materials Application

Tasks that helped to scaffold student success were those which enabled students to relate their investigation into materials or components that they were considering for use in their major product in Assessment Type 3. Successful students showed evidence of in-depth investigation by providing descriptions of testing procedures, and conclusions drawn from their tests, rather than reporting ‘third-hand’ data. Both qualitative and quantitative testing were features of strong achievement against the performance standards.

Examples of successful skills tasks within each of the subject's three focus areas include:

Communication Products

- animation sequences
- Photoshop skills
- CADD 3D models, orthogonal drawings, and associated renders
- 'small' websites
- 'compact' database and spreadsheet assignments.

Material Products

- small furniture item (such as a table or cabinet), where two skills tasks were combined; that is, the making of the item, and the finishing sequence
- jointing exercises — wood
- jointing exercises — metal
- metal items (such as a bar clamp), where the fabrication served as one assessment piece, and the metal turning, the other.

Systems and Control Products

- NC (numerical control) code writing
- introductory programming for a robotics sequence.

Assessment Type 2: Product

Major Product

Student achievement against the performance standards was largely pleasing and a significant number of student responses demonstrated sophisticated application of skills, processes and procedures, accomplished use of materials, and the ability to problem-solve challenges that arose during the construction phase.

Courses that provided opportunities for students to successfully engage with the performance standards had achievable outcomes, were designed in partnership between teacher and student, and clearly required work of appropriate depth and rigour. Most often these responses were in relation to an identified need or a challenge that engaged both the teacher and the student.

Evidence of planning and evaluating was provided in the product record. Students who provided sound evidence via the product record included annotated images of the sequential progression of the realisation of the product, together with written evidence of planning, and evaluative comments by the student. A neat way that some students presented this was by using a table, with images in one column and the related comments in another.

Examples of successful responses within each of the subject's three focus areas include include:

Communication Products

- calendars exhibiting student photography
- web pages exhibiting student photography
- animations
- web pages
- graphics/industrial design
- CADD
- 3D modeling, prototyping, and associated orthogonal and rendered drawings.

Material Products

- large to medium-sized framed and carcase construction furniture products
- beds
- metal braziers/outdoor heaters
- barbecues
- weight benches
- holding/clamping devices.

Systems and Control Products

- robotic, programmed solutions
- CADD/CAM used to develop a range of prototype products, and associated drawings
- injection moulding tools.

Minor Product

Teachers, and consequently students, had few problems differentiating between major and minor products. Some successful responses combined the minor and major products (for example, drawers in a cabinet; feedback forms and associated databases in a web page; and 3D renders and orthogonal drawings), with the tactile prototype as the major product, while other courses contained discrete tasks for the major and minor product. Evidence of planning and evaluating was provided in the product record.

EXTERNAL ASSESSMENT

Assessment Type 3: Folio

The discussion that follows is divided into the assessment design criteria and specific features that the folio was assessed against.

Investigating

Identification of a Need, Problem, or Challenge

The more successful responses were able to establish a clear need for the product. An imaginative 'need' identification assisted students to be creative in the

development of their product. The established need and relevant design situation were normally closely linked to the design brief, unpacking the student's intentions. Most responses were able to provide a statement of intent based on an identified need.

Investigation and Critical Analysis of the Characteristics of Existing Products, Processes, Systems, and/or Production Techniques

Responses varied depending on the focus area. It was expected that this analysis be closely linked to the design brief. The more appropriate responses analysed existing products using design principles relevant to the focus area. For example, a review of existing furniture might include examining the variables of size, cost, physical description, aesthetics, materials, joint types, hardware used, ergonomics, proportion, and line. On the other hand, critical analysis of photography might include composition, cropping, and the elements of design such as line, shape, tone, texture, pattern, and colour.

Satisfactory web pages included at least analysis of loading times, navigation systems, aesthetics (including themes), template structures, fonts, forms, intended audience, image properties, and page formatting. Desktop publishing included analysis of size and style of font, spacing between letters and words, line spacing, white space, and visual elements, along with analysis of the impact of graphics and visual cues. Where images of existing products are used which are not the work of the author, each must be clearly referenced and acknowledged.

Production techniques were best analysed using graphical techniques such as screen shots and images with annotations. Some responses presented specifications of tooling from technical publications. This approach was less appropriate as it often did not add to the understanding of the student's intentions. Successful student responses included an informative description of alternative production methods, as this part of the investigation is clearly critical to the success of any realised design outcome.

Investigation of Product Material Options and Analysis for Product Use

While some students effectively analysed a range of material options for use in their product, the majority listed the materials that they had predetermined to use. When determining material options, a reference to the results of the materials application investigation in Assessment Type 1 would be advantageous. Materials investigated will be dependent on the focus area studied and might include file formats, fabrics, paper types, or finishes. This section should not include a survey of tools to be used.

Investigation into the Impact of Products or Systems on Individuals, Society, and/or the Environment

The better student responses clearly identified at least one issue of concern related to their product. Such responses provided a clear introductory paragraph, a number of paragraphs of discussion, and a summary or conclusion. Those investigations that displayed focus, perception, and depth of knowledge were also referenced appropriately.

Planning

Analysis of Information to Develop Appropriate Solutions to an Identified Design Brief

The better student responses analysed their investigation. This analysis resulted in a range of possible solutions that were imaginative, innovative, and enterprising. From this range, the best student responses then went on to identify and explain the most appropriate possible solution. This identification was based on how well each proposal satisfied the initial design criteria.

Regardless of the focus area, many students placed too great an emphasis on presenting the outcome without fully addressing all possible options in the planning stages. For example, in a Communication Products course based on CAD/CNC, the NC outcome was provided without fully addressing all CAD or CAM options.

To be concise, communication should be graphically based with clear annotations. As a student moves closer towards a final outcome, it is expected that drawings will become more detailed and that the student will show an understanding of drawing conventions relevant to the focus area.

Students who were able to synthesise their own information could generally meet the performance standards to a higher level than those who used teacher-generated proformas such as cutting/materials lists.

Testing, Modification, and Validation of Ideas or Procedures

The best responses detailed results during assembly. Depending on the focus area, such detail might include, for example, interference reports during CAD assembly, circuit testing in electronics, simulation of CNC operation, and trial assembly in a workshop, Flash error reporting and troubleshooting during multimedia production or network testing.

Such validation needs to be relevant to focus area conventions and documented clearly. Complete product records are not required.

Evaluating

In general, the markers felt that it would have been beneficial for responses to include an image of the finished or nearly finished product.

Evaluation of Product Success against Design Brief Requirements

The best student responses evaluated the product objectively using initial design criteria established during the investigation. This process helped the student to make qualitative statements about how design criteria could have been better fulfilled. Such comments were considered insightful.

Evaluation of the Effectiveness of the Product or System Realisation Process

Students used this section as a forum to detail the strengths and weaknesses of the product or system.

Reflection on Materials, Ideas, or Procedures, with Recommendations

The best student responses noted any shortcomings throughout the project and suggested means by which those shortcomings would not be repeated.

Analysis of the Impact of the Product or System on Individuals, Society, and/or the Environment

The foremost question students tended to pose was 'Does the product work?' However, the best student responses reflected on their investigation into the impact of products or systems on individuals, society, and/or the environment. Such responses included considered statements discussing topics such as the life cycle of the product, the recyclability of the product, the product's ecological footprint, or how the user's life is made better by the product. The best responses were of a global nature.

OPERATIONAL ADVICE

The following advice is provided by the moderation panel:

Assessment Type 1: Skills and Applications Tasks

- The supply of clearly annotated images of each skills task should be accompanied by mark sheets indicating how the tasks were assessed against the performance standards.
- In many instances, a number of tasks were submitted with little or no evidence.
- Tasks can be submitted effectively in either digital or hard-copy fashion.

Assessment Type 2: Product

- This assessment can take many forms, depending on the context. It is incumbent on the teacher to ensure that there is enough evidence to support the grade requested. Examples include a series of annotated images, the supply of orthogonal and rendered drawings, or a working website. If using digital technologies, an AVI student screen-capture presentation works well.
- A product record is required for both major and minor products.

Assessment Type 3: Folio

- It is a SACE requirement that the folio is not submitted in folders. If there is a reason why a folder must be used, please contact the relevant SACE Board officer for advice. The standard format across all subjects is a stapled document, inclusive of a title page containing student SACE details, school number, and the course code data.
- Students should ensure their compliance with the maximum of 2000 words for written submissions, or the designated equivalent for other formats. Word-counts should be verified by the teacher before submission to the SACE Board.
- Students who choose to submit the folio in an electronic format should give consideration to how the folio is modelled to suit the format. Many responses to

this assessment task submitted paper versions of a PowerPoint presentation, which would have been better submitted as word-processed documents.

- Student names or school identifiers should not be included.

- Teacher-prepared support material or course notes should not be included. It was noted that teacher-prepared scaffolding often restricted the students' ability to show their full potential. Furthermore, students who used correct SACE course descriptors were more likely to address the criteria successfully.

- Some teachers mistakenly sent in folio materials with their moderation materials. Please note that there are different dates for the submission of these materials.

GENERAL COMMENTS

While the first year of the new SACE at Stage 2 has provided some challenges for teachers and students alike, the overall results were very sound, with a large number of students achieving a result in the 'B' band. Significantly, Assessment Types 1 and 2 were highly successful, as they were well within the 'comfort zone' of most teachers and students. The practical responses, although huge in their contextual variations across Material Products, Communication Products, and Systems and Control Products, were skillfully and diligently completed, indicating strong engagement with both the practical nature of these tasks and the relevant performance standards.

Assessment Type 2 required a product record for both the major and minor products, to help provide evidence towards the specific features associated with planning and evaluating. There were many strong responses to the product record, and they were typically a series of annotated images or AVI files, providing a clear summary of the production process. Importantly, they contained student evaluative comments which were prominently demonstrated in association with the key parts of their manufacturing processes.

The external assessment (Assessment Type 3: Folio), however, provided challenges for many students. This was a new process for teachers and students, and it is hoped that advice given in this document will assist preparation for 2012. While many teachers and students were able to provide excellent engagement with the relevant specific features of the assessment design criteria, and they were able to work within the discipline of a word-count, a lack of depth in some responses was also clearly evident. Thoughtfully prepared, differentiated, and structured teaching was clearly evident in successful student responses. Indicators of this sound teaching included student folios which presented informative design briefs, full and appropriate investigations relevant to the product being designed, insightful analysis of a relevant technological issue, complete planning (including testing and modifying the product), and an analytical evaluation.

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