

External Assessment subject report

Graphics

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Introduction

In Semester 2, 2016, the Queensland Curriculum and Assessment Authority (QCAA) trialled external formative assessments in Year 11 Economics and Graphics.

The *External Assessment Trial — Semester 2, 2016* familiarised schools and students with subject-based external assessments and tested processes for their delivery. Approximately 1776 students from 84 schools were involved in the trial, and some 40 teachers participated in the online marking operation.

The trialled assessments were aligned to existing syllabuses and developed in consultation with subject experts from schools, subject associations and universities. These assessments provided an alternative to a task already being undertaken at participating schools. They were administered under secure conditions and graded externally.

The QCAA appreciates schools' participation in the *External Assessment Trial*. The teachers and students who participated in the trial have made a valuable and significant contribution to Queensland's new system of senior assessment.

This report provides information on the *External Assessment Trial: Graphics* assessment specifications, the sample responses and the performance characteristics of students. The trial was conducted using the current syllabus, with Year 11 students and in a formative context. Commentaries and sample responses should be viewed in this context.

Electronic versions of the assessment are available online.

Claude Jones

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Overall commentary

The *External Assessment Trial: Graphics* was a *supervised design folio* developed by the Queensland Curriculum and Assessment Authority (QCAA) and conducted under supervised conditions. The assessment was completed by 1267 students across 72 participating schools between 22 August and 9 September 2016, over a period of 7 hours 15 minutes.

The *supervised design folio* was devised from the Graphics 2013 senior syllabus. It required students to demonstrate their understanding of two objectives in *Knowledge and understanding* and all objectives in *Analysis and application* and *Synthesis and evaluation*.

To prepare students for the assessment, schools were provided with a unit of work that contained subject matter and suggested timing and sequence based on the design area of Built environment design: Architecture (syllabus, p. 10). The unit explored the core subject matter: A design process (syllabus, p. 4).

Students were required to solve a design problem graphically by engaging in a design process using the mid-century modern style, specific client needs, and site specifications. The design folio technique (syllabus, p. 19) assessed the development and creation of graphical representations.

In *Knowledge and understanding*, 89% of students achieved a passing grade — 14% at A standard, 30% at B standard, and 45% at C standard. In *Analysis and application*, 82% of students achieved a passing grade — 10% at A standard, 28% at B standard, and 44% at C standard. In *Synthesis and evaluation*, 70% of students achieving a passing grade — 5% at A standard, 22% at B standard, and 43% at C standard.

Note that the statistics in this subject report may have been rounded, resulting in totals not equal to 100%.

Figure 1: Knowledge and understanding

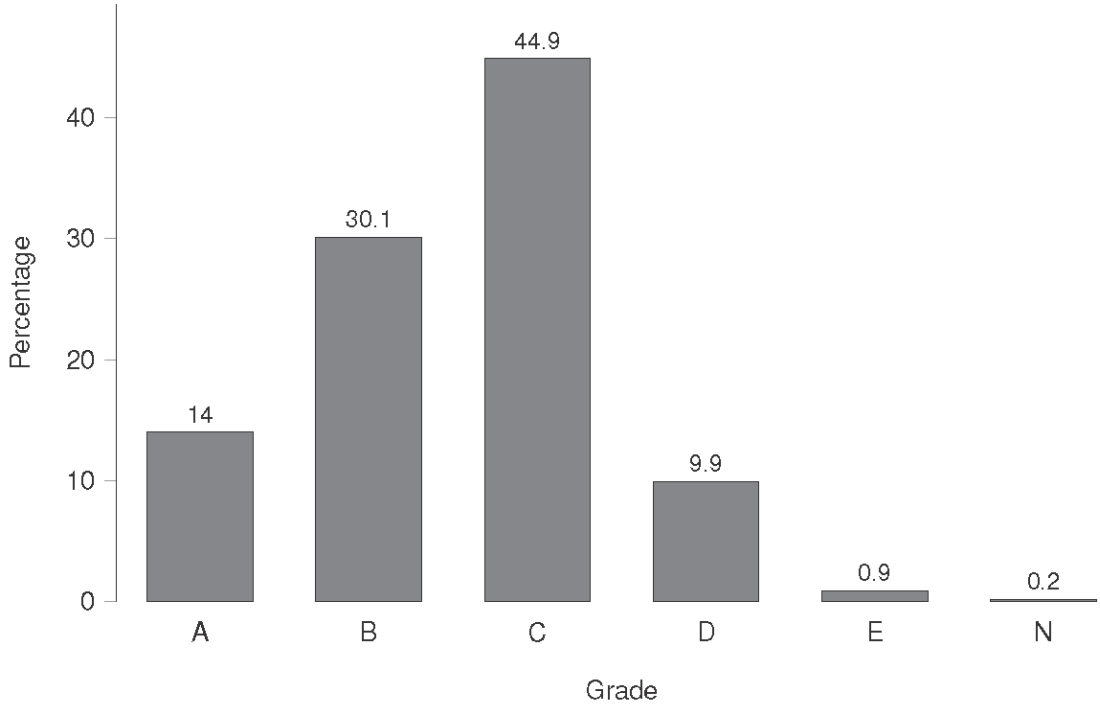


Figure 2: Knowledge and understanding by gender

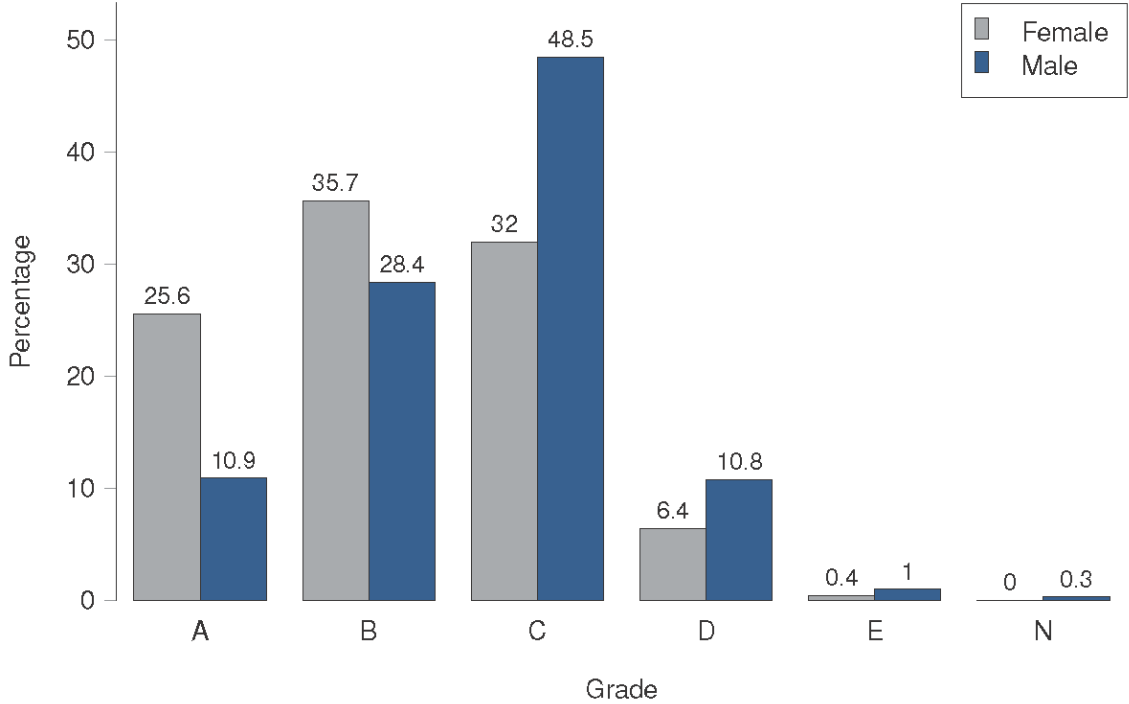


Figure 3: Analysis and application

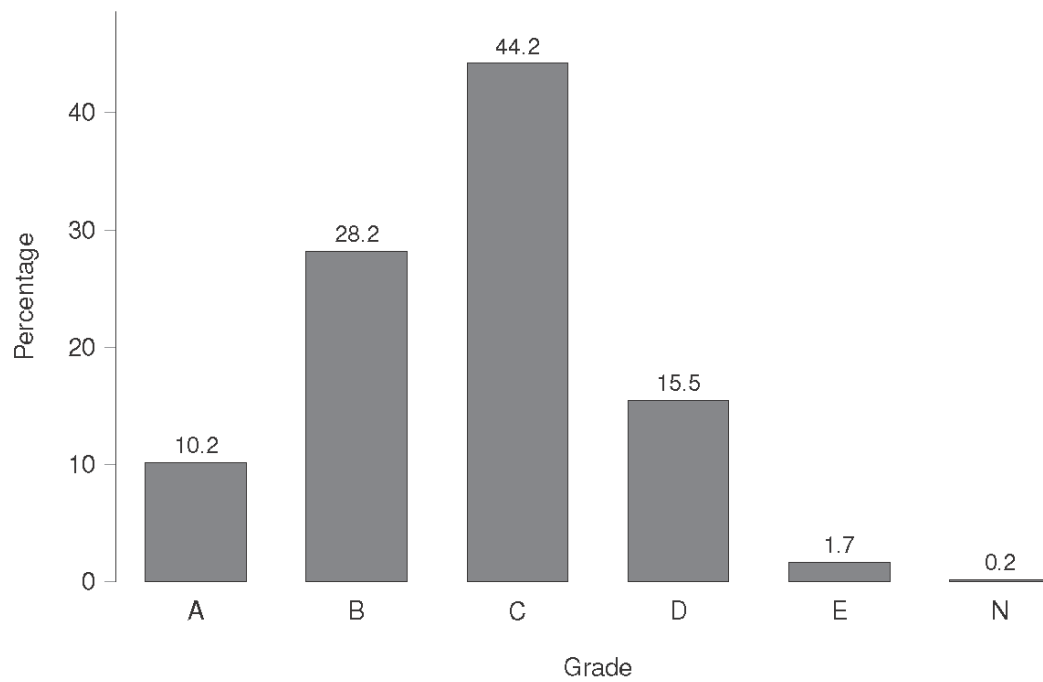


Figure 4: Analysis and application by gender

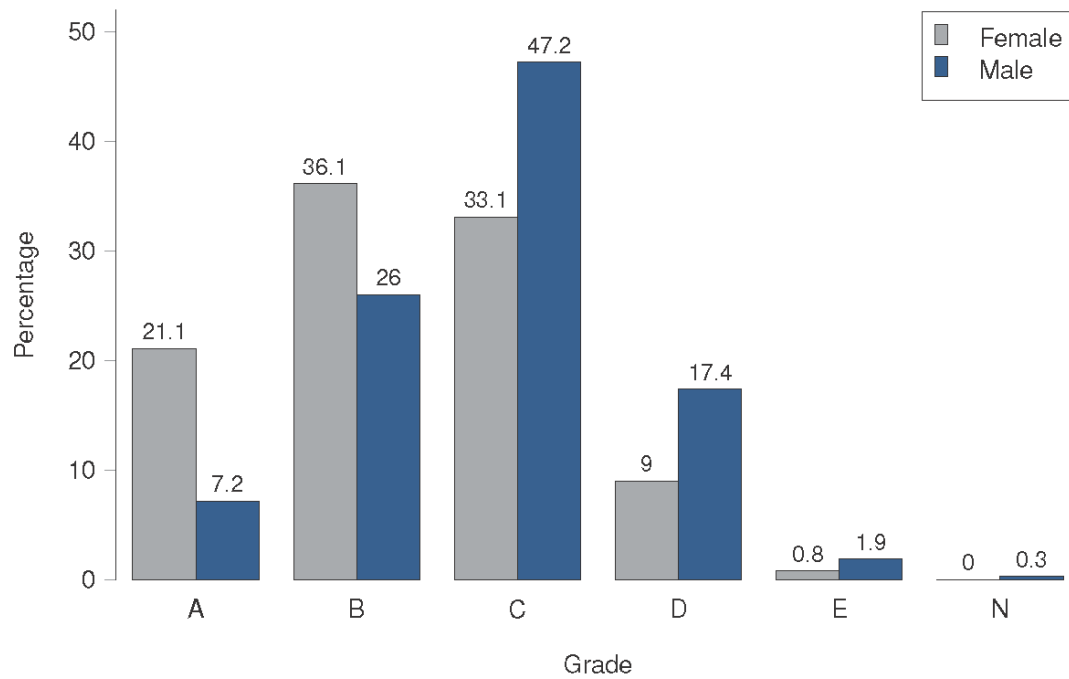


Figure 5: Synthesis and evaluation

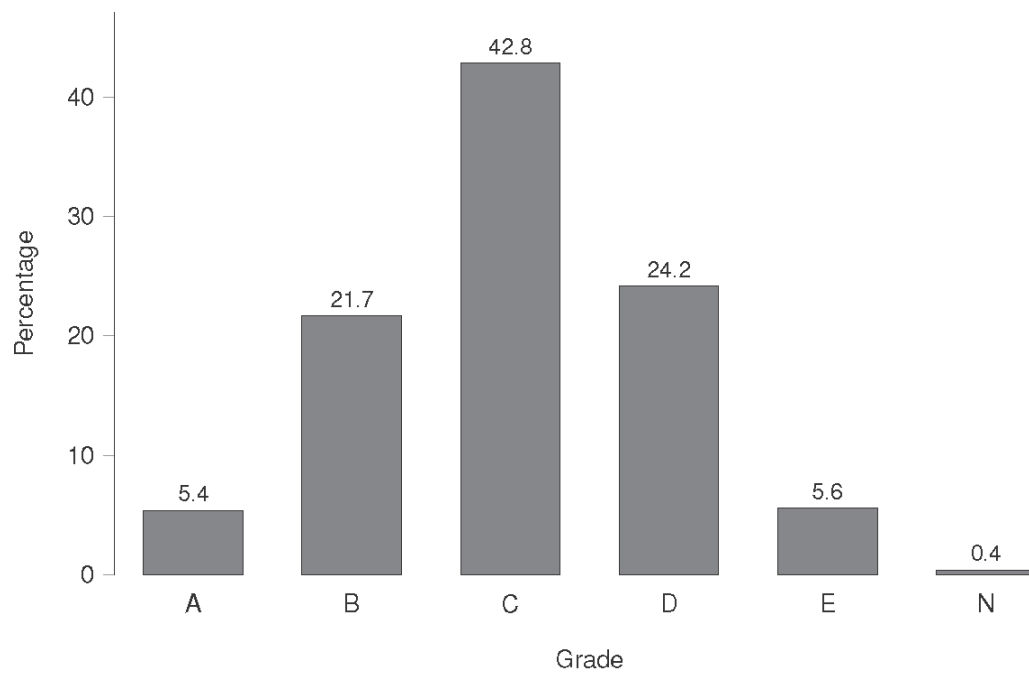
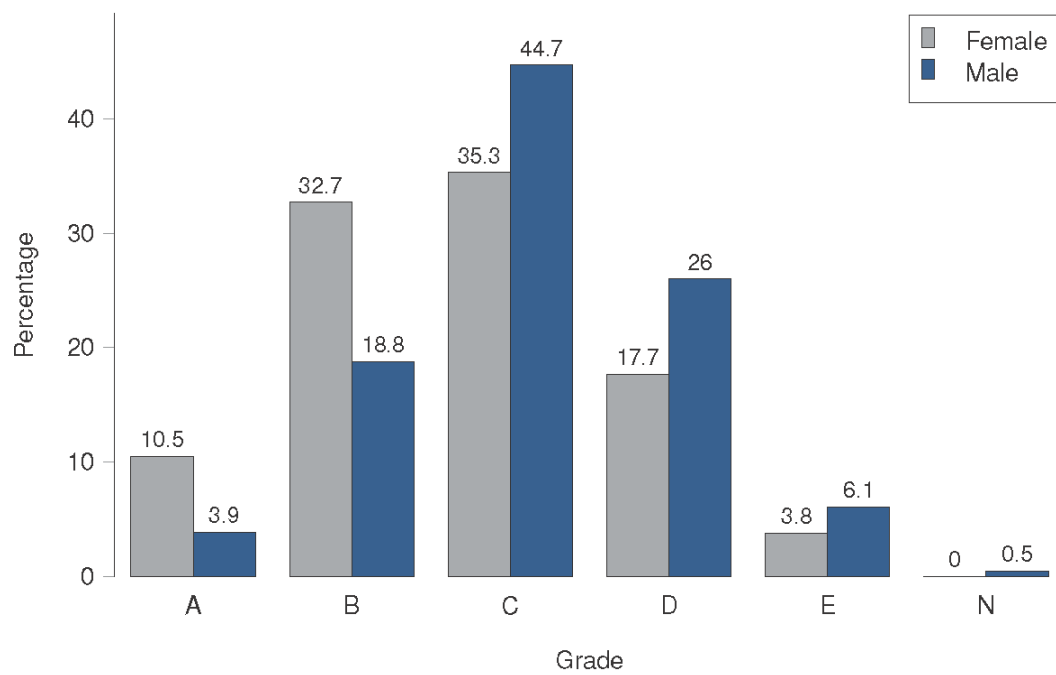


Figure 6: Synthesis and evaluation by gender



Sample responses and commentaries

The sample responses provided model an appropriate response to the task. Evidence from the selected responses has not been corrected for grammar, spelling or factual accuracy. Responses provided are a sample of responses only, and are not necessarily exemplary responses.

Knowledge and understanding

Design criteria

Students were required to create criteria by which their design solution would be judged using all three design factors. These criteria were to be divided into two categories: design criteria and graphical criteria. This enabled students to describe a wide range of design features.

Component 2: Exploring the design problem — design and graphical criteria (*Response book*, p. 9) provided evidence for the design criteria objective in a majority of responses. However, the planning section (Component 1: Planning) also provided supporting evidence about this objective.

Typically, students were able to identify and describe some design criteria that referred back to the three design factors (user-centred design, elements and principles of design, and materials) but often they found it difficult to describe the criteria for judging the graphical representations they were required to create. As a result, these responses found it difficult to identify a wide range of design features.

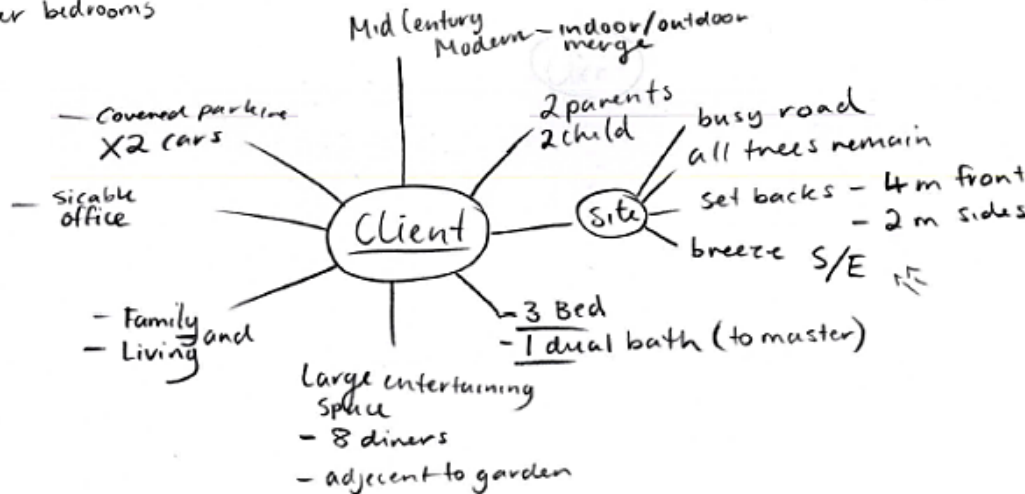
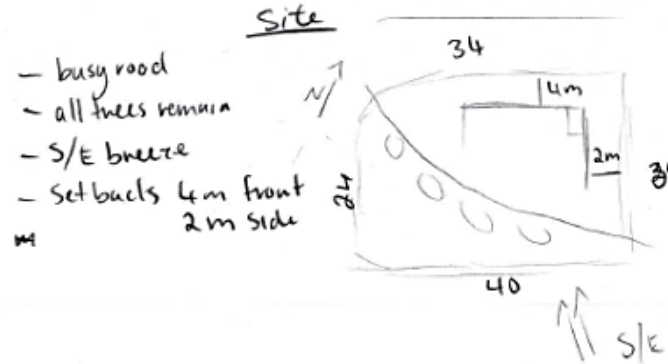
Responses at an A standard:

- described both design and graphical criteria
- referred these criteria back to the design factors and covered all three design factors (user-centred design, materials, and elements and principles of design)
- displayed a good coverage of the design features from the three design factors, e.g. open-plan living areas, natural-textured materials, client needs, and strong horizontal and vertical features.

Sample response

Mid Century Modern

- open plan, kitchen, dining, gathering areas
- Split levels, living rooms
- carport, attached/unattached
- Strong horizontal/vertical lines
- flat roofs
- glass, large floor to ceiling windows
- Integrate nature
- Asymmetric
- Natural materials, warmth
- Smaller bedrooms



Materials

- Natural, woods, concrete, stone
- glass windows
- Flooring bare
- warmth

Sample response

Design criteria

- Does the design solution effectively address the clients requirements of a Mid Century Modern Design through the use of internal and external elements of design?
- How has the design solution effectively employed the aspects of mid-century modern materials, such as colour, texture and tone?
- How has the design solution taken into consideration the user-centred design aspects the site placement and functionality?
- How has the design solution effectively employed the Mid-century modern elements and principles of design, such as the use of space, line, shape and form and balance?

Graphical criteria

- Has the design solution incorporated an array of 2D and 3D graphical representations to communicate finished external product?
- Has the design solution effectively communicated the internal elements and principles of design, such as the use of materials and space, for the target audience?
- Does the design solution use suitable conventions such as appropriate scale/proportion, colours to effectively communicate materials?
- Does the design solution take into consideration the knowledge and understanding of the client?, i.e. are the drawings too technical?

Graphical principles, procedures and conventions

Students were required to demonstrate their knowledge of graphical principles, procedures and conventions through their drawings and sketches. Evidence was found primarily in Component 4: Production. However, sketches and drawings throughout the overall response also provided evidence.

Responses generally displayed appropriate use of these principles, procedures and conventions with their 2D responses, but 3D responses varied more widely in their quality. 3D responses sometimes lost control of the proportion, scale or viewing positions, or had difficulty with the size or composition of the sketches and drawings.

Responses at an A standard provided evidence of:

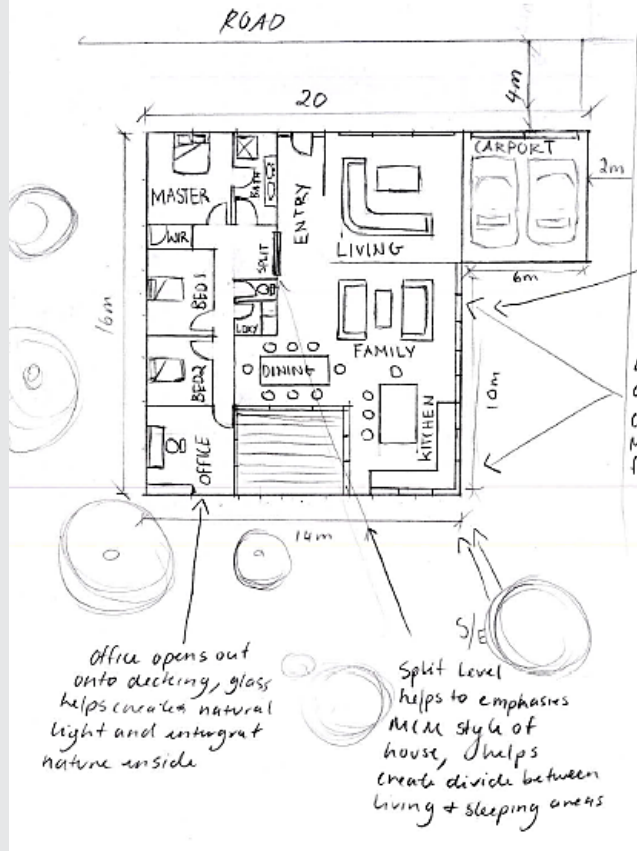
- appropriately selected 2D and 3D sketches that demonstrated comprehension of graphical principles, procedures, and architectural conventions for a non-technical audience
- a thorough range of sketches that displayed an understanding of the principles, procedures, and conventions required, e.g. use of rudimentary furniture, representation of materials, use of architectural conventions (door openings, windows) and perspectives in proportion and scale.

Sample response



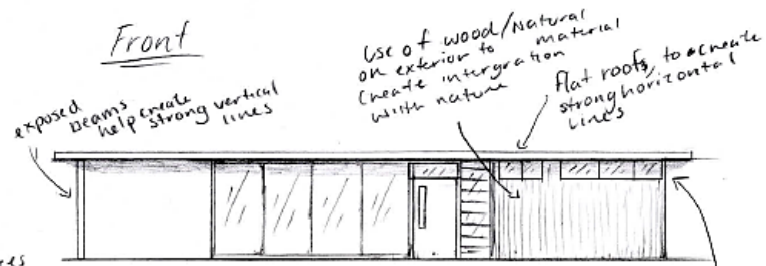
Sample response

Refined floor plan Idea #3 (Final)

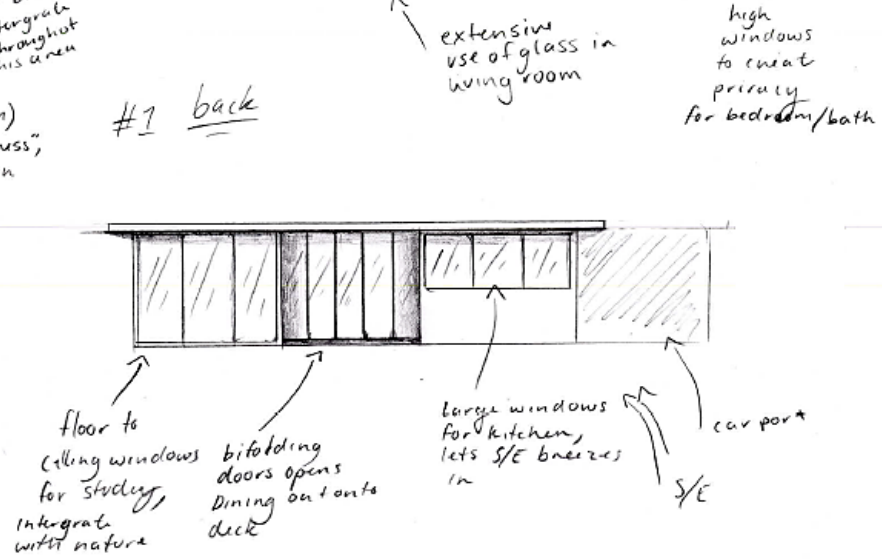


Elevations Ideas

Front



#1 back



extensive use of glass assists natural light, prevailing S/E breezes and helps integrate nature throughout this area

Larger living areas (open plan) creates "togetherness", Mid-century Modern feel

Analysis and application

Creating and developing design ideas

Students were required to compose and develop design ideas and display links to the three design factors (user-centred design, elements and principles of design, and materials) that were to be considered. Evidence of these ideas was primarily demonstrated in Component 3: Developing ideas. However, many responses again provided evidence in Component 1: Planning.

Responses that did not display a range of design ideas or development of these ideas had difficulty in demonstrating a comprehensive and discerning application of the design factors. Responses that concentrated on one idea tended to focus on aspects of user-centred design and did not consistently incorporate materials and elements and principles of design.

Responses at an A standard included evidence that:

- demonstrated a comprehensive and discerning application of the design factors
- covered a good range of the design features within the design factors
- included a good range of sketches that developed feasible ideas.

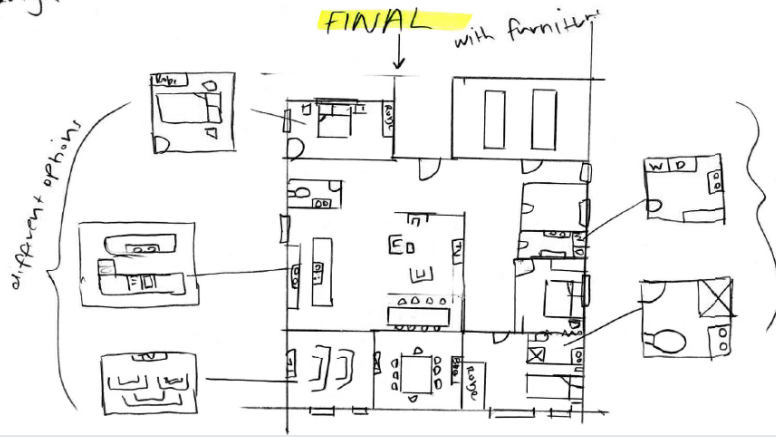
Sample response

Floor Plan - Transforming the bubble diagrams into a realistic room structure



Annotations

Throughout this ideation process the kitchen, dining and living have been altered and concluded with an open plan living. The front room has been made the boys room separating him from his sister and parents. The breeze has been utilised and the Mid-century modern characteristic for integrating nature has been implemented.



Annotations

Students were required to annotate the material provided in Stimulus 4: Examples of mid-century modern architectural style and graphical representations. Students were to annotate two pages of images and make insightful comments relating to the three design factors of user-centred design, elements and principles of design, and materials. Where there was little or no evidence of annotations on these two pages, any further evidence of annotations in other components was considered.

Responses that displayed few annotations had difficulty in displaying any analysis of graphical and design features. Responses which labelled features on images rather than annotating them with meaningful statements linked to the design factors had difficulty displaying a thorough analysis of graphical and design features.

Responses at an A standard included annotations with evidence that:

- showed analysis, displaying insight on a range of stimulus images
- demonstrated a thorough analysis of graphical and design information
- identified relevant design features within all design factors
- linked stimulus clearly to design factors.

Sample response



Architectural sketching techniques

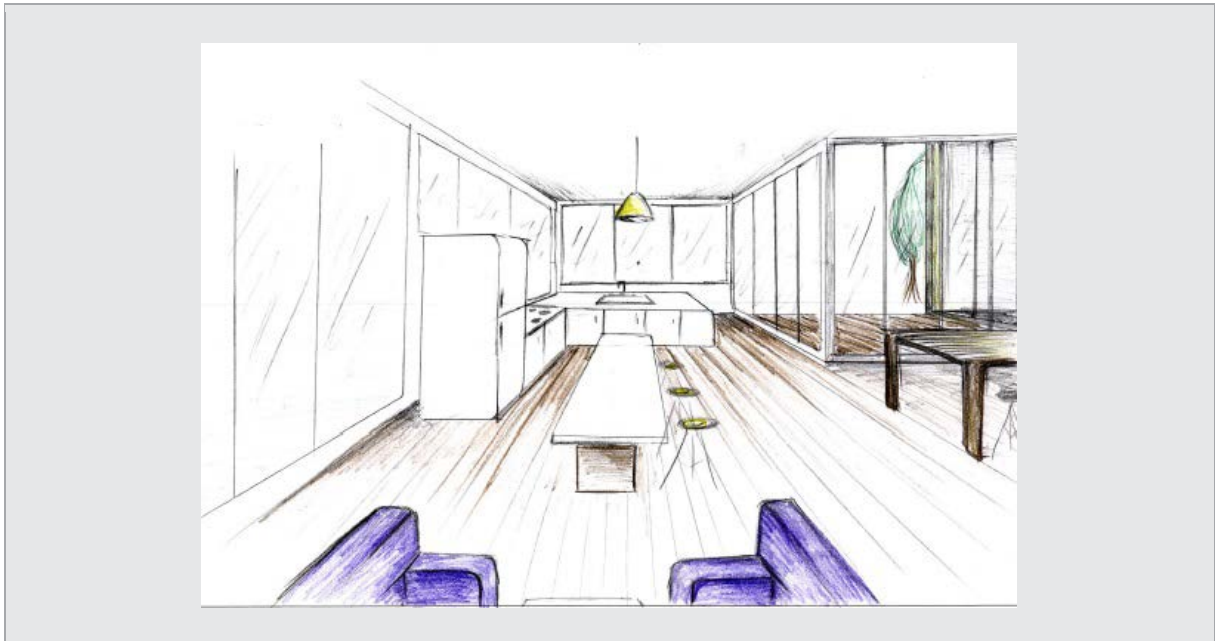
Students were required to demonstrate evidence of sketching in the concept phase of a design by skilfully producing drawings and sketches for a non-technical audience. Responses needed to demonstrate thoughtful composition, refinement, visual appeal and appropriate proportion and scale.

Most responses showed an ability to create 2D graphical representations displaying architectural sketching techniques, some with visual appeal. Many found 3D graphical representations more difficult, with a loss of control of some aspects of the sketches. Most commonly, there was a loss of proportion and/or scale, a lack of consideration of the client needs, or a lack of visual appeal.

Responses at an A standard provided:

- a wide range of 2D and 3D drawings and sketches that were suitable for learning at this stage of the course
- evidence of the skilful use of architectural sketching techniques suitable for the concept phase of a design
- sketches that were suitable for a non-technical audience and that accurately applied proportion and scale
- evidence of enhancement of visual appeal by appropriate use of the elements and principles of design, e.g. texture, colour, tone, shading and line work.

Sample response



Sample response



Synthesis and evaluation

Synthesis of ideas

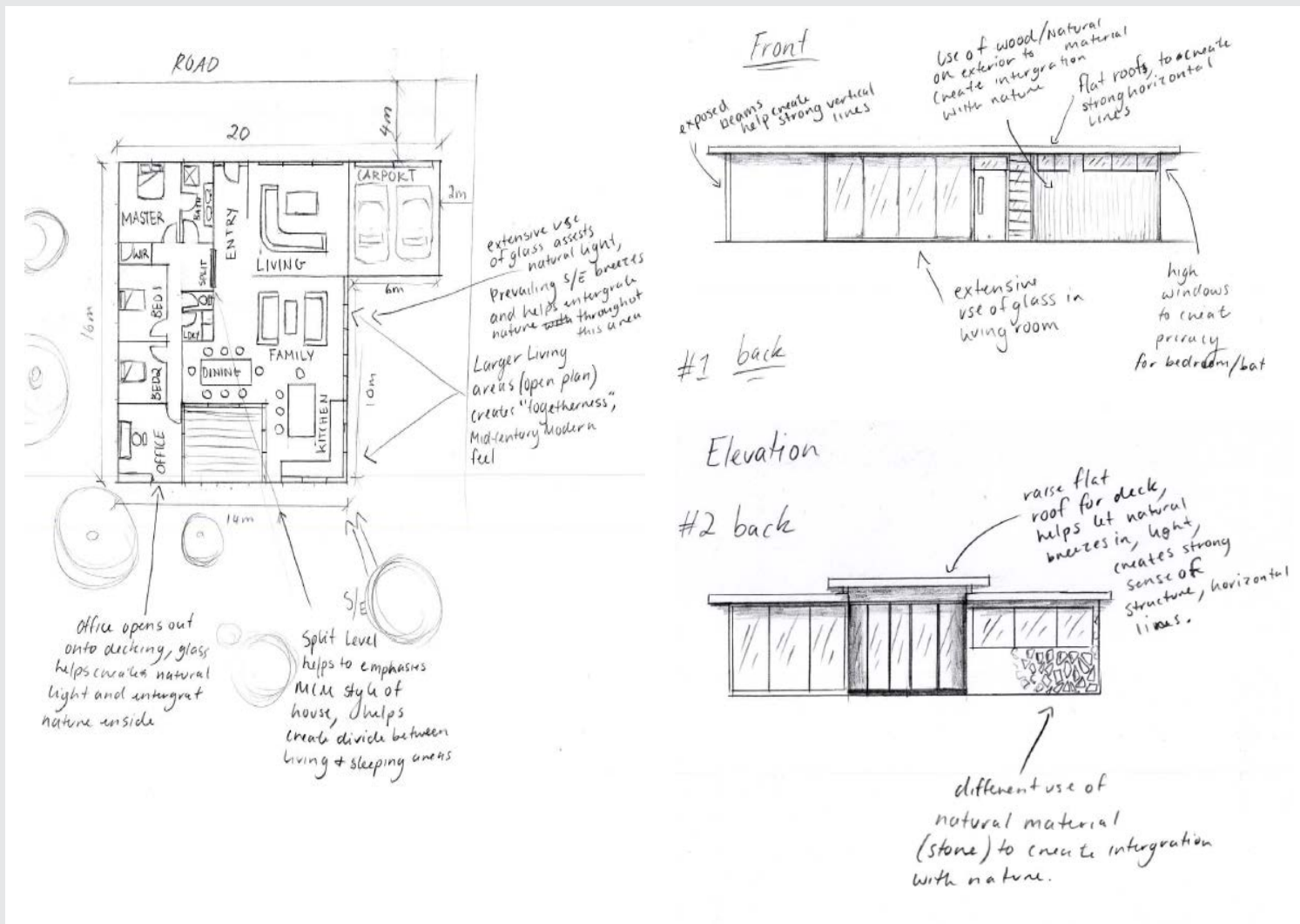
Students were required to insightfully integrate a broad range of the design features through their ideas. They were also required to describe the ideation process and those ideas through their annotations.

Evidence in responses demonstrated a tendency towards difficulty providing insightful comments about design ideas and solutions in annotations. Responses often had few annotations or annotations that displayed little evaluation of the sketches they had produced. While most responses included some coverage of design features, these tended to cover the major points (e.g. strong geometric shapes and open-plan living) with little evidence of the minor points (e.g. an uncluttered design, capturing south-east breezes).

Responses at an A standard:

- evaluated ideas/sketches using insightful annotations to display how the design features had been incorporated through their ideas
- included solutions that showed a broad coverage of the design features and a synthesis of these features to create the solution.

Sample response



Evaluation and recommendations

Students were required to evaluate their design solutions, making direct links to the design criteria they described in the design exploration phase. Students evaluated using the same two categories: design aspects and graphical aspects. They were to comment insightfully on the feasibility of their solutions using their design criteria and cover all three design factors — user-centred design, elements and principles of design and materials.

Students were also required to make recommendations for the improvement of their design solutions. These recommendations needed to be valid and justify their recommendations, which linked back to the design features and design factors.

Of the five components in the task, responses addressed this component least effectively, demonstrating difficulty in linking evaluations to the design criteria. Comments were often personal with insufficient linkage to their design criteria and/or the design factors and features. Similarly, a significant number of recommendations were not linked to design factors and were often based on opinion or thoughts.

A substantial number of responses did not complete evaluations and recommendations for Component 5: Appraisal, or this part of the response lacked detail.

Responses at an A standard:

- made insightful statements that covered both design and graphical aspects. They referred back to the criteria that they had established in Component 2: Exploring the design problem, and displayed coverage of all design factors/features
- offered discerning recommendations to improve the graphical product and/or design solution, using knowledge of the design features
- provided valid justification of their decisions to further develop, use or discard their graphical product and/or design solution. Justifications were based on the design features.

Sample response

Design

Mid-century modern (MCM) common materials chosen on the basis of historical application. Use of different textures not fully achieved. Angular style roofing not clear in final solution — suggest roofline follow more closely the MCM style, i.e. flat, no pitch.

Graphical

Floor plan mostly satisfied criteria statement — basic detail, all features satisfied; split level could have provided more basic dimensions to give user/client more concept of available space.

Recommendations

Further development of floor plan design necessary. Indoor/outdoor brief not fully achieved. Suggest redesign to ensure the indoor/outdoor entertainment areas are more seamless in their use and appearance. This will more closely suit the needs of the client.

Recommendations and guidelines

- To address *Knowledge and understanding* and *Analysis and application* effectively, students must be able to produce graphical representations in the concept phase of a design process, and draw in both 2D and 3D modes.

In order to do this, students need to place more emphasis on acquiring these architectural sketching skills to increase their capacity to respond appropriately to design tasks.

- To address *Analysis and application* effectively, students must also be able to annotate stimulus materials and their own work with a high degree of analysis.

Comments need to show insight and create understanding for the reader. Students must show full coverage of the design factors being considered and identify both relevant design and graphical features that the designer is considering when composing solutions.

- To address *Synthesis and evaluation* effectively, students must be able to demonstrate the link between the design criteria and the evaluation of their solutions.

In order to do this, students need to evaluate the success of their solutions by responding to each of the criteria they have created. Students were least able to demonstrate insightful or effective evaluation within the appraisal component of this assessment. Evaluations must cover the appropriate design factors and discuss the feasibility of the ideas, displaying insight in the response.

- To address *Knowledge and understanding*, *Analysis and application* and *Synthesis and evaluation* effectively, students must be able to effectively manage and dedicate appropriate time to each component in the design process.

Incomplete and partially completed responses demonstrated a lack of efficient time management across responses. Students would benefit from more emphasis on and development of this important skill.

Appendix 1: Instrument-specific standards matrix

	A	B	C	D	E
The student work has the following characteristics:					
Knowledge and understanding	<ul style="list-style-type: none"> • identification and comprehensive description of relevant design criteria • thorough comprehension of a range of graphical principles, procedures and conventions 	<ul style="list-style-type: none"> • identification and description of relevant design criteria • effective comprehension of graphical principles, procedures and conventions 	<ul style="list-style-type: none"> • identification and description of design criteria • comprehension of graphical principles, procedures and conventions 	<ul style="list-style-type: none"> • identification and unclear description of aspects of design criteria • comprehension of aspects of graphical principles, procedures and conventions 	<ul style="list-style-type: none"> • identification of some design criteria • recollection of some graphical principles, procedures or conventions
Analysis and application	<ul style="list-style-type: none"> • discerning application of user-centred design, elements and principles of design, and materials to develop a range of feasible ideas • thorough analysis and insightful interpretation of graphical and design information • sophisticated use of a range of graphical skills to produce graphical products responsive to the needs of the family 	<ul style="list-style-type: none"> • effective application of user-centred design, elements and principles of design, and materials to develop a range of ideas • effective analysis and interpretation of graphical and design information • proficient use of a range of graphical skills to produce graphical products effective to the needs of the family 	<ul style="list-style-type: none"> • application of user-centred design, elements and principles of design, and materials to develop ideas • analysis and interpretation of graphical and design information • use of graphical skills to produce graphical products for the needs of the family 	<ul style="list-style-type: none"> • application of aspects of user-centred design, elements and principles of design, and materials to develop simplistic ideas • explanation of graphical and design information • use of basic graphical skills to produce graphical products 	<ul style="list-style-type: none"> • minimal application of aspects of user-centred design, elements and principles of design, and materials to identify ideas • reference to graphical or design information • use of limited graphical skills to produce simplistic graphical responses

	A	B	C	D	E
The student work has the following characteristics:					
Synthesis and evaluation	<ul style="list-style-type: none"> thorough synthesis of MCM-style design, client needs and site constraints to develop insightful solutions insightful evaluation of design and graphical representations of MCM-style home discerning recommendations and valid justification of decisions 	<ul style="list-style-type: none"> effective synthesis of MCM-style design, client needs and site constraints to develop effective solutions effective evaluation of design and graphical representations of MCM-style home considered recommendations and plausible justification of decisions 	<ul style="list-style-type: none"> synthesis of MCM-style design, client needs and site constraints to develop solutions evaluation of design and graphical representation of MCM-style home recommendations proposed and justification of decisions 	<ul style="list-style-type: none"> selection of MCM-style design, client needs and site constraints to develop partial solutions comparison of design and graphical representations of MCM-style home some recommendations justified by opinion 	<ul style="list-style-type: none"> selection of MCM-style design, client needs and site constraints statements about graphical representations of MCM-style home some superficial recommendations

Appendix 2: Glossary of terms

These terms were used in the *External Assessment Trial: Graphics*.

Term	Definition
accurate	precise, to the point; consistent with a standard
analysis	the dissection of data and information to ascertain and examine constituent parts and/or their relationships
application	putting something to use
aspects	a facet, phase or part of a whole, therefore incomplete
basic	underdeveloped, simple and straightforward
client	The person, group or community for which drawings are made. The client may have specific requirements for the types of drawings produced. The client is often the intermediary between the person who produces the drawings and the end-user, manufacturer or builder.
comprehend	Demonstrating that the meaning of something is understood. In Graphics, comprehension is understood by the way students accommodate the conventions required for the creation of their graphical representations.
considered	thoughtful, to take into account the pros and cons or possibilities of a situation
design brief	A design brief is developed as a result of exploring the design problem, outlines the design problem using relevant design factors, and includes the identified needs of the user or target audience in a selected design area. A design brief will indicate the ways forward to solving the design problem, include the particular audience for the graphical products, and indicate the required graphical representations.
design criteria	Arising from the design factors, these criteria are used to judge the final design solutions and graphical products. For example: <ul style="list-style-type: none"> • Do the final drawings meet the target audience's needs? • How effectively does the design solution meet the particular audience's requirements? • Have the graphical representations communicated the critical attributes of the solution? • How well have the required conventions been followed?
design strategies	Design strategies concern the conceptual ways in which solutions to design problems are developed and include the thinking skills that facilitate innovation and creativity. Often these developments will be expressed as annotations or explications on graphical representations.
detailed	meticulous, including many of the parts
diagram	A diagram is a symbolic representation of information according to some visualisation technique. It is often two-dimensional and geometric. Symbols, charts, graphs and maps are forms of diagrams.
discerning	making thoughtful and astute choices
drawings — concept	Concept drawings are illustrations that convey a visual representation of a design, idea, and/or mood, before it is put into the final product. Concept drawings assist in the visual development of an idea or design. Concept drawings are used across all design areas and may be sketches, 2D or 3D

Term	Definition
	technical drawings.
drawings — development	Development drawings are 2D drawings that depict the shape of a 3D object and often contain detail about folding, transition from different shapes. They may also include net and pattern information.
drawings — final	Final drawings are finessed images used to provide the solution to a graphical design problem. These will range from completed technical drawings that stipulate all details for production, to logos and product packages used to sell products, to working animations. The type of final drawing applicable to demonstrating the solution to the design problem will depend on the requirements of the client.
drawings — perspective	Perspective drawings represent an image as seen by the eye. It is used to give a three-dimensional appearance. There are two common characteristics in perspective drawings. Firstly, objects appear to get smaller and closer together the further away they are, and secondly, an object's dimension along the line of sight is relatively shorter than dimensions across the line of sight. There are a number of types of perspective drawings including one-point, two-point and three-point perspective.
drawings — presentation	Presentation drawings are drawings intended to explain a scheme and to promote its merits and may include working drawings that use tones or hatches to emphasise different materials. Rendering is the art of adding surface textures, shadows and/or reflections to show the visual qualities of a building more realistically. Other specialists may be involved in the preparation of specialist presentation images.
drawings — survey	Survey drawings show the precise measurements, geographical features, structures, boundaries etc. on a particular property, while site plans document how a parcel of land is to be improved, including the outlines of all structures and site improvements.
drawings — working	A working drawing is a type of technical drawing, often used as part of the documentation needed to build an engineering product or architecture. For example, in architecture, these could include civil drawings, architectural drawings, structural drawings, mechanical drawings, electrical drawings, and plumbing drawings. In engineering, these drawings show all necessary data to manufacture a given object, such as dimensions and angles, surface finishes, tolerances, revisions and material selections.
effective	causing a result, especially the desired or intended result
effectively	meeting the assigned purpose; in a way that produces a desired result
elements and principles of design	Elements and principles of design are the visual tools of design used in every design field. Elements form the basic components of visual design. They are the materials upon which the principles of design act.
end-user	the person, group or community that uses the product
essential	necessary, of the most or highest importance for achieving something
evaluation	assigning merit according to criteria
feasible	capable of being achieved or put into effect, reasonable enough to be believed or accepted
graphical conventions	The conventions, rules, standards or requirements that are applied in the production of graphical representations. Conventions are applicable to particular design areas and will change according to circumstance and audience. Conventions include the Australian Standards.

Term	Definition
graphical principles	the underlying mathematical frameworks based on descriptive geometry that underpin the construction and generation of 2D and 3D technical drawings
graphical procedures	manual (sketching) and computerised techniques and processes used to generate technical orthogonal and pictorial graphical representations
graphical products	the range of graphical representations that demonstrate both the development of ideas and design solutions
graphical skills	Graphical skills include: <ul style="list-style-type: none"> • sketching and drawing skills • technology skills • knowledge of procedures and conventions.
improbable	not likely to happen, or be effective
insightful	perceptive, demonstrating high levels of understanding; sometimes innovative and creative
iterative	recursive; revisiting earlier parts of a process to further clarify meaning or refine ideas and solutions
justification	Providing sound reasons or evidence to support a decision. Soundness requires that the reasoning is logical and, where appropriate, that the premises are likely to be true.
plausible	believable and appearing likely to be achievable
proficient	demonstrating a high degree of skill
project management	Project management refers to planning, organising and managing resources to achieve graphical solutions.
relevant	applicable and pertinent; has direct bearing on
sections	cut-away sections are technical drawings that provide a particular view or views. These drawings are mostly associated with production of objects, often in manufacturing and engineering industries.
simple	easy to understand and deal with; may concern a single or basic aspect, few steps, limited or no relationships
simplistic	tending to oversimplify, especially by avoiding or ignoring complexities
sophisticated	complex and advanced
succinct	expressed with brevity and clarity, with no wasted words
suitable	of the right type or quality for a particular purpose or occasion
superficial	apparent and sometimes trivial; lacking in depth
sustainability	Sustainability involves the connection and interaction between social, ethical, economic and environmental systems to ensure sustainable outcomes.
synthesis	assembling constituent parts into a coherent, unique and/or complex entity
technologies	Technologies refer to the range of tools, processes and skills needed to realise graphical solutions.
thorough	demonstrating depth and breadth, inclusive of relevant detail

Term	Definition
unclear	not obvious, definite, or easy to understand
uneven	varying and inconsistent
user-centred design	<p>User-centred design optimises the product around how a person can or needs to use a product. In user-centred design purpose, function and design area are the basis on which students formulate and define the types of graphical representations required to solve a design problem. They are interconnected and require consideration together.</p> <ul style="list-style-type: none"> • Purpose — Students examine the reason for which the drawings will be produced for the design problem. They ask what is the intended goal or outcome for these drawings. • Function — Students examine how the subject of the design problem is designed or suited to its audience and critically evaluate its suitability. Students examine how drawings will be used and how they may be manipulated to suit the needs of the client or target audience. • Design area — Students examine the environment in which these drawings will be produced and ask if there are specific requirements or conventions for that area.
valid	plausible and logical, reasonable and justifiable
views	Single, multiple and section views are technical drawings that provide a particular view or views. These drawings are mostly associated with production of objects, often in manufacturing and engineering industries.
well-reasoned	logical and sound, considered
<p>Sources: Queensland Curriculum and Assessment Authority, Graphics 2013 senior syllabus www.qcaa.qld.edu.au/downloads/senior/snr_graphics_2013_syll.pdf</p>	