2023 Design, Technology and Engineering Subject Assessment Advice

Overview

Subject assessment advice, based on the 2023 assessment cycle, gives 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, and the quality of student performance.

Teachers should refer to the subject outline for specifications on content and learning requirements, and to the subject operational information for operational matters and key dates.

School Assessment

Assessment Type 1: Specialised Skills Task

Students complete two specialised skills tasks. They demonstrate skills and knowledge that will be required for the realisation of their solution. They apply the skills, processes, and techniques in the chosen context. This informs the design development for a solution in Assessment Type 2. Students evaluate and assess the development of their own skills in this assessment task. They review how these processes and techniques may influence their solution.

In the context of Digital Communication Solutions:

Successful responses typically showcased a logical development of skills with clear, sophisticated evidence and analytical reflection relevant to the AT2: Design Process and Solution, while less successful ones demonstrated limited proficiency, simplistic skill tasks, and lacked analytical evaluation and evidence of problem-solving.

In the context of Industry and Entrepreneurial Solutions:

Successful responses often involved students justifying relevant skills, providing photo evidence, and designing their own projects, whereas less successful ones typically featured uniform projects, teacher-provided plans, limited reflection, and a lack of industry or entrepreneurial connections.

In the context of Material Solutions:

The most successful responses featured detailed, high-resolution visuals of both the process and the final product, critically evaluated and reflected on skills development with relevant terminology, and documented learning effectively, while less successful ones lacked detailed evidence of production, used simplistic language, and provided poor quality visuals and minimal reflection.

In the context of Robotic and Electronic Solutions:

Successful responses to the project demonstrated a high understanding and practical application of technical skills, supported by well-documented evidence and analysis, whereas less successful responses lacked depth, understanding, and practical evidence of learning.

For all Design and Technology contexts:

Teachers can elicit more successful responses by:

* using AT1 as an opportunity for general skills and knowledge development early in the course, which gives students the opportunity to demonstrate a range of processes and techniques that they may harness within AT2
* understanding that while the AT1: Specialised Skills Task provides the opportunity for general skills and knowledge development early in a course it needs to be recognised that it is a summative assessment process and should not dominate time allocation at the expense of other course requirements
* avoiding tasks that provide limited opportunity for differentiation in the assessment of individual student learning and skills e.g. following a step-by-step skills tutorial which resulted in a common outcome for all students.

The more successful responses commonly:

* demonstrated a logical sequence of skills development using clear photographic evidence
* provided evidence that clearly illustrated the sophistication of the skill through well-considered images, screenshots or short videos
* used multiple photos of the product being constructed as well as multiple photos of the finished product
* identified the importance and relevance of the chosen specialised skills to the successful completion of their AT2: Design Process and Solution
* used relevant technical language, and was able to convey a high understanding of the skills and application of their newfound knowledge
* demonstrated problem solving
* identified problems and highlighted the best ‘solution’ for their situation, rather than generic outcome statements
* clearly reflected on the results of their skills development. For example, rather than simply describing what was done in the skills task, the student explained why and how the result affects their decision making
* included relevant and appropriate reflective comments that were both comprehensive, insightful, and inclusive of the depth and rigour needed at this level
* demonstrated high-order personal critiquing and evaluation of skills developed, then reflected on its application in the final product outcome
* featured learning that was clearly documented and sequenced
* used large resolution photos in which the relevant visual details (such as the product, construction methods etc) are easily identified.

The less successful responses commonly:

* showed limited proficiency in the use of equipment, processes, and techniques
* showed limited evidence of production and skills development
* featured skill task design that was too structured or simplistic and did not provide the student with the opportunity to demonstrate highly sophisticated use of skills
* used simplistic technical terminology and/or did not use specific and relevant technical terminology in their annotations
* provided no annotation of skills and process learning
* did not document the problems that occurred, and how they were solved, throughout the production process
* provided more of a descriptive recount of processes, rather than analysis and possible application of these skills to AT2: Design Process and Solution
* had poorly presented evidence, with a lack of images or videos to demonstrate skills or processes undertaken
* provided poor quality visuals or too many small, unnecessary images
* had an evaluation that was either missing or too simplistic and descriptive (such as a simple recount of the processes undertaken) rather than analytical and reflective of the skills relevant to the manufacturing of the AT2: Design Process and Solution
* had limited reflection and evaluation of what was learnt, changes that could be made, and how the learnings will be applied to their final product
* featured a project which was completed by every student in the class
* were based on a teacher provided template/plan of what needed to be made for the task- the student did not design their own
* focussed on skills tasks not related to AT2.

Assessment Type 2: Design Process and Solution

Students produce one task in the design process and solution assessment type that provides evidence of the stages of the design and realisation process. The task must showcase and evaluate the solution or product.

In the context of Digital Communication Solutions:

Successful design responses were characterized by a well-defined design process, effective planning and documentation, technical proficiency, and innovative problem-solving, while less successful efforts lacked clear process use, detailed planning, and sophisticated skill development.

In the context of Industry and Entrepreneurial Solutions:

Successful responses often detailed clear, research-backed product targeting which chose a specific target market/consumer (e.g. teenage vegans) rather than broad (e.g. all adults in Australia), while less successful ones lacked explanatory annotations and were overly guided by teacher prompts.

In the context of Material Solutions:

Successful design projects were characterized by thorough planning, detailed analysis, innovative production, and critical evaluation which included concept sketches, detailed sketches and/or CAD drawings, while less successful ones lacked depth, clarity, and justification throughout the design process.

In the context of Robotic and Electronic Solutions:

The most successful responses typically demonstrated a high level of technical knowledge, structured evaluation, and multimodal presentations, including detailed investigations of multiple aspects according to design briefs, effective design development, and thorough documentation, whereas the less successful ones lacked understanding, analysis, justification, visual documentation, and appropriate technical language.

For all Design and Technology contexts:

Teachers can elicit more successful responses by:

* ensuring that students have the opportunity to progressively maintain notes and records that address all the performance standards in detail
* including multimodal evidence like videos or photos to capture the progressive evidence of the learning and production
* recognising the significance of student learning and use of the design and realisation process
* avoiding heavily scaffolded projects for students and avoid the use of a common tasks in AT2.
* encouraging students to adhere to the maximum word count (3000 words)
* using videos as evidence.

The more successful responses commonly:

* identified a clear need statement, design brief, and constraints with pictures of how or where the solution would be used
* used the design process that was featured in the subject outline, and the students clearly labelled and planned the folio with this format
* clearly linked the design and planning with product development and outcome and referred back to the need, design brief and constraints
* demonstrated an in-depth analysis of existing products or processes using correct technical language and succinctly discussed relevance of specific features to their intended design
* conducted their own research to gather data e.g. surveys
* had the investigation and analysis looking at parts, components, and techniques the student intended to use which linked to their findings from their research in AT3
* had a strong investigation of more than one product, process, material, component, system and analysed these according to set design brief and constraints in an in depth and comprehensive way
* had a clear design sequence, i.e., beginning with a concise and targeted design brief/statement of intent, and working through the investigation and analysis, design development and planning, through to realisation and evaluation
* had excellent evidence of design development and planning which incorporated mind maps, GANTT charts along with other relevant technical information describing concepts and possible procedures and technical settings
* included detailed annotated sketches in the planning phase that effectively communicated a conceptual idea or process
* considered design and production options throughout the manufacturing process and provided reasons and justification for changes
* explained how their product was refined/adapted through the creation process
* featured design development and planning which examined more than one design solution, refined and problem-solved to develop a final design concept
* in design development and planning, the student used annotated screen captures and visual representations to support their need/design brief
* had clear design development and planning, which resulted in a considered design and corresponding confidence in the production process
* used multimodal responses to present the design process, to provide well-organised evidence of product development
* applied thoughtful testing and assessment of components that influenced product features
* demonstrated excellent evidence of problem solving moments with relevant solution or modifications to achieve outcome functionality
* had authentic user testing which was incorporated in the development process with appropriate modifications or recommendations made
* showcased a clearly sequenced product record, detailing decisions made, including decisions that did not link with the student’s investigation and design development, and the reasons for this
* demonstrated innovation and highly proficient skills in the production of the solution
* had well-organised Design Folios that were characterised by easy-to-follow structure, explicitly covering all four elements of the design process and included performance standard signposting
* had a presentation of the process and final product demonstration that was sophisticated, utilising clear, large and good quality images or video (with audio commentary) demonstrations to convey functionality of the product outcomes or features
* had clear documentation demonstrating the critical moments of development or product outcomes or features that incorporated supporting graphics and or video along with concise annotations and use of correct technical terms
* had a reflective evaluation discussing the successes or challenges in the realisation of the product brief outcomes
* featured an evaluation which discusses the processes undertaken, along with modifications and identified areas for improvement and which discussed each stage of the design process in a critical and comprehensive way
* had an evaluation which comprehensively analysed and compared the initial need or design process with the solution
* identified success criteria for the major product that provided a source of comparative information for the evaluation
* had an evaluation which included explanations regarding the student’s decision-making processes as well as any refinements or modifications made to the solution
* used relevant technical language and was able to convey a high understanding of the skills and application of their newfound knowledge. Evaluation was completed in chronological order, providing a context for their evaluation of the features or a response to issues
* adhered closely to the 3000 maximum word count.

The less successful responses commonly:

* produced a design brief that did not clearly identify a need for their solution, was too vague or too broad and lacked specific outcomes or product features
* featured a very structured design brief, or a template, with the whole class producing the same or similar product that restricted sophistication and creativity
* featured a design brief which lacked structure and purpose linking to the design process
* had an analysis of existing products which was very limited or superficial (for example, simply indicating preference or choice without justification)
* had technical language which was limited and failed to highlight specific elements and relevance to the intended design
* featured very little analysis of information researched, with no justification of decisions
* showed little evidence of the use of a design process being used, which provides a foundation for the student’s investigations and subsequent decision making in the product development
* had limited evidence of planning, concept development, project management, and testing of specific outcomes or product features
* did not demonstrate a comprehensive understanding of materials and techniques that the student was exploring or in showing their planning toward their solution
* did not demonstrate depth and sophistication in skill development and processes undertaken
* did not show depth or rigour in design and skill development
* had minimal sketches, annotations or concepts, using plans already made or downloaded from the internet
* had no visual representation and annotation to demonstrate development and planning
* had evidence of production which was minimal, and photos were small
* featured descriptive account of production process with little or no evidence for problem solving and testing
* featured a production process which was conveyed more as an ongoing journal than well-documented concise, critical moments in the production process
* did not address the problems that occurred during the realisation process and steps taken to solve these
* had an evaluation which provided an account of processes, but was constrained in its ability to provide discussion and analysis of the realisation of the design brief, outcomes or production processes
* had no user testing or recommendations for product improvements
* had and evaluation which lacked depth of discussion and was more descriptive than analytical
* had skills and processes showcased in the final product which were limited and did not meet the expected standard
* had an evaluation which did not refer to the need or design brief and whether it had met this, and no discussion of any refinements or modifications made
* had an evaluation which lacked justification for their final design and did not discuss any key features/elements that were included and did not use any technical language
* had no use of technical terminology in context
* included images without annotations to explain skill application and reflection.

External Assessment

Assessment Type 3: Resource Study

Students undertake one resource study comprising two parts.

Part One: Resource Investigation

Students investigate and analyse the functional characteristics and properties of two or more materials or components that they are considering for use in the creation of their solution. They report on how their research into and testing of the functional characteristics and properties of these materials or components will affect the student selection for use in the realisation of their solution.

Part Two: Issue Exploration

Students investigate and analyse ethical, legal, economic, and/or sustainability issues related to their solution.

Resources Study Part One: Resource Investigation

In the context of Digital Communication Solutions:

Successful responses to the report effectively combined clear introductions, relevant contextualization, well-formulated hypotheses, and comprehensive testing with both qualitative and quantitative analysis, while less successful ones lacked context, depth, and rigorous evaluation of testing outcomes.

In the context of Industry and Entrepreneurial Solutions:

Successful investigations were clearly focused, well-researched, and directly linked to the product design with detailed testing and coherent summaries, whereas less successful ones lacked clear purpose, failed to connect research to the product, and demonstrated a limited understanding of the investigation's goals.

In the context of Material Solutions:

Successful responses effectively integrate and contextualize their research and testing within the AT2: Design Process and Solution, identifying two or more materials or components that are going to be investigated, utilizing clear structure, targeted testing, and multimodal evidence to inform and refine their design decisions, while less successful responses lack relevance, detailed testing, conclusive evidence and used testing that was incongruent with the intended use or design of the solution, limiting their project's development.

In the context of Robotic and Electronic Solutions:

The more successful responses often featured thorough resource research linked with solution exploration, justified decisions, clear photographic evidence, and proper referencing, while less successful ones lacked impact evaluation, photographic proof, and meaningful testing or data, relying instead on basic comparisons from data sheets.

For all Design and Technology contexts:

The more successful responses commonly:

* began with a brief and clear introduction to the report identifying the rationale and application of the testing in planning for product realisation
* clearly contextualised the relevance of the investigation to the student’s AT2: Design Process and Solution and provided very purposeful, relevant, and well-targeted testing
* linked the investigation cohesively to the relevant product being designed, which may include images of the product accompanied by clear descriptions
* identified clearly which aspect of AT3: Resource Study was being addressed (Resources/Issues) by providing clear titles and headings or even separate files
* showed clear linking of project idea with reasoning for required investigation and experiments
* formulated a valid hypothesis for testing and subsequently substantiated the results through thorough research
* used thoughtfully selected tests that incorporated both qualitative and quantitative data that were clearly analysed and represented with the use of charts, diagrams or images.
* provided testing in these responses which was comprehensive, featuring several different tests of the same material or component
* presented analysis which demonstrated depth of thought and relevant research into the materials that were tested
* provided evidence of data sets, graphing, and reflection of data along with the impact of choices
* used a scientific report approach to provide a hypothesis/aim and an outline of the purpose and procedure of what was being tested and why
* clearly explained their intended aim of their test and how they would test
* reflected on results of experiments and made comparisons to the aim and purpose of the testing, resulting in evaluative judgments supporting product realization for AT2
* discussed the validity of results obtained, including limitations, trends, and outliers in the data obtained
* analysed the researched information and the results from the testing, thereby personalized their response in the conclusion for part one
* clearly linked the testing outcomes to the functional requirements of their product and made concise recommendations
* featured conclusions which went beyond summarizing results, incorporating informed analysis that considered both research findings backed up with anecdotal evidence
* verbalised important criteria for the investigation and linked the investigation directly to the requirements of their product. This could have been applied to specific materials, processes or testing results
* included clear sequential evidence through annotated photographic images, screen capture and/or video demonstrating testing procedures and the equipment used.
* had in-depth student lead research and testing with clear procedures and images describing the testing being conducted
* contained a clear summary of the most important points identified through their investigation and clearly and accurately referenced these points back to their product
* used in-text referencing and bibliography.

The less successful responses commonly:

* provided a mere recount of the testing process without engaging in a thorough analysis of the results
* had insufficient depth of research through multiple sources
* had informal or missing bibliographies
* lacked adequate testing of the components and qualitative results that included data represented in charts, leading to vague and uncertain results and conclusions
* did not provide analysis of results to draw conclusions or make predictions to inform decisions for their product
* did not provide sufficient evidence of testing, such as results and photos to substantiate that this investigation did occur
* over-researched material options, reducing word availability for testing and part two
* provided little or no data sets or evidence of testing: Multimodal evidence is encouraged to capture testing, such as photos or screen captures
* provided no context as to why the investigation was chosen, or the investigation was generic or not relevant to the student-negotiated AT2: Design Process and Solution
* used a generic test, sometimes completed by all class members. This limited the connection and relevance to the students’ own product
* researched information, but did not connect the information to their product effectively or in some instance did not link it together at all
* had tests where the links to AT2 were not easily identifiable
* focused on too many components to test with any rigour or depth
* was very descriptive and process-driven, which would have been better served as a skills task (AT1)
* described processes rather than testing processes, materials, or components
* limited details on what the student learned through the testing and how they would apply this to AT2
* did not draw conclusions or evaluate the results of testing
* lacked a clear purpose for the testing, which impacted the student’s argument for the need for the testing
* had evaluation/conclusions which made minimal reference to impact on the final solution and choices made
* was whole class derived: investigation provided the same information as other students in the class, generated through a scaffold process by the teacher
* was a templated task for students, featuring a series of instructions and questions that students answered, which limited student agency and effective contextualisation to the students AT2: Design Process and Solution
* used no references/sources or included incorrect formatting of references
* made sweeping statements that were in many cases unchecked, false, and misleading
* provided no, or very little, photographic evidence to showcase experiments.

Resource Study Part Two: Issues Exploration

In the context of Digital Communication Solutions:

Successful responses effectively communicated the issue, its relevance, and included in-depth investigation with examples, charts, and statistics, supported by a variety of research and references, while focusing on a single issue and incorporating visuals, whereas less successful ones were overly similar, lacked depth, and failed to adequately link their topic to AT2 or provide substantial evidence and references.

In the context of Industry and Entrepreneurial Solutions:

Successful responses clearly identified the topic and purpose, summarized key findings with accurate references, and demonstrated in-depth, student-led research with clear procedures, whereas less successful ones failed to connect information to their product or demonstrate an understanding of their investigation's purpose.

In the context of Material Solutions:

Successful responses were detailed and analytical, clearly stating relevant issues, using well-referenced sources for a convincing argument on ethical, legal, and sustainability considerations in design phases, while less successful ones lacked focus, depth, and substantiated analysis, often diverging from the project's context.

In the context of Robotic and Electronic Solutions:

The most effective responses often delve into current and relevant topics across various scales, offering detailed personal insights and thoroughly linking resources to solutions and their rationales, while the less effective ones lack citations, arguments, focus, and bibliographies, resulting in superficial coverage

For all Design and Technology contexts:

The more successful responses commonly:

* identified the individual topic clearly and the specific purpose of the investigation
* clearly stated the issue that was going to be discussed and its relevance to their AT2: Design Process and Solution
* included a clear conclusion that summarises their researched findings with links to their AT2: Design Process and Solution
* included a depth of investigation with supporting examples, charts and or statistics
* was supported by a relevant bibliography and used in-text referencing or annotation with correct formatting of these references, included referencing to cite facts, studies, and statistics to strengthen the research
* referenced sources of information about the identified issue, with the best examples using a combination of secondary sources, and primary information gained from actual businesses, suppliers, individuals or organisations
* discussed and analysed with detail, relevant, local, and emerging issues relative to the design solution in AT2. This could be in the design, manufacture, use or disposal phases
* developed a convincing argument rather than just giving information
* presented well-articulated personal opinions and analysis
* included a clear evaluation of the issue that had been researched and a conclusion that highlighted the student response to their findings
* explored current and relevant (local, national, and international) topics. Gave detailed personal opinions and analysis of new findings
* had in-depth linking of resource investigation and issues exploration with the solution and justification/reasoning of choices and decisions made in the solution
* considered more than one perspective or opinion on issues, such as highlighting both pros and cons
* validated opinions against research and evidence
* focused on in-depth discussion of only one of the following: legal, ethical, economic, or sustainable issues, rather than attempting to addressing all of them
* use of supporting graphics to reinforce discussion
* discussed ethical, legal, economic or sustainability issues that were directly relevant to the project being undertaken. The student was able to comment on the effect these considerations might have on the choices they made regarding the design or development of their major project.

The less successful responses commonly:

* relied on unsubstantiated personal views and opinions rather than constructing a sound point of view based on the data or information discovered
* had limited or no referencing or bibliography, discussing too much from own opinion without evidence of research
* tried to cover too much using sub-headings (sustainable, legal, economic, ethical), limiting the opportunity for the student to go into depth
* discussed multiple themes or topics which did not allow for depth of discussion
* included discussion that was not relevant to the topic, often accessing foreign resources which described circumstances or materials not available locally
* selected a topic/issue with no clear links to AT2: Design Process and Solution
* lacked in-depth research and discussion
* did not clearly define an issue but rather explained a production process
* used a limited range of resources, and was limited to statements of fact or procedure rather than a critical evaluation of the information
* was brief and used little or no sources, references or bibliography
* was whole class derived, based on the same issue, and was therefore very structured and produced similar investigations which limited student agency and effective contextualisation to the students AT2: Design Process and Solution.