National Certificate of Educational Achievement

2012 Assessment Report

Technology Level 1

STANDARD REPORT

91048 Demonstrate understanding of how technological modelling supports decision-making

COMMENTARY

Evidence for 91048 should come from level six of the Technology Learning Area in The New Zealand Curriculum.

Successful candidates often provided evidence for 90148, by reporting on modelling within technological practice. These reports showed how results of the modelling informed the development of a technological outcome.

Candidates were often successful if they included a brief and specifications in their report. This showed what modelling needed to be carried out for which purposes. Candidates were often very successful when they included discussions of how/why evidence from specific modelling guided specific actions.

Candidates using a case study to inform their own practice often showed breadth and depth in their explanations and justification of what was being done as a result of the modelling. However, candidates who relied only upon a case study often did not demonstrate their understanding.

Candidates who did not achieve often presented reports that described and recount all of the steps in the outcomes development. Reports that focused on the specific modelling that led to the next steps in the development of an outcome usually succeeded. Reports that used a range of evidence, such as a focused description of modeling in practice supported by annotated photographs and sketches helped candidates to demonstrate their understandings.

When the Assessment Specification were not followed, candidates were disadvantaged. This was often true where handwriting was illegible or photographs or photocopies were two small or out of focus to be useful.

ACHIEVEMENT

Candidates who were awarded Achievement commonly:

- identified the purpose of modelling
- described how the modelled was done
- described a result from the modelling
- described a decision based on the modelling.

NOT ACHIEVED

Candidates who were awarded Not Achieved commonly:

- described technological practice in general but did not describe modelling
- did not describe a result from the modelling
- lacked any specific reasons for changes

- reported a case study and recounted the practice of the technologist rather than the modelling, the evidence, and the decisions from the evidence
- worked with a template that did not allow for all of the requirements of the standard.

ACHIEVEMENT WITH MERIT

Candidates who were awarded Achievement with Merit commonly:

- explained the purpose of the modelling and why it was being undertaken
- explained the decisions made from the modelling undertaken
- linked the decisions from the modelling to the next stage in the technological practice
- used actual knowledge in the decision making process
- gave clear examples of modelling and explained the decisions made as a result of the modelling.

ACHIEVEMENT WITH EXCELLENCE

Candidates who were awarded Achievement with Excellence commonly:

- explained the purpose of the modelling
- considered a range of solutions and explained the practical and functional reasoning in their decision making
- showed a depth of understanding of modelling through informed discussions
- used evidence from modelling to check and justify decisions
- planned and discussed the next steps based on evidence from modelling to overcome any risk that was identified
- used a range of modelling techniques to test against the specifications and justified fitness for purpose
- provided a comprehensive report of modelling within a case study, explaining what the technologist modelled, giving examples, explaining what decisions were made, and used the modelling practices within the case study to inform their own practice.

STANDARD REPORT

91049 Demonstrate understanding of how materials enable technological products to function

COMMENTARY

Candidates whose report was in line with the specifications were advantaged.

Candidates who explained sourced information in their own words were rewarded.

Candidates who included diagrams explained in their own words often did well.

Reports without or with poor referencing were disadvantaged.

Submissions in which there were similarities between candidate reports raised doubts about the quality of the demonstration of individual understanding.

Font sizing, font mixing, and font colouring often made text illegible. The minimum size is meant to be 12 and a consistent black font throughout would help make scripts easier to read.

Candidates who had used classroom based testing and experimentation were often able to develop their report better than those who only relied upon research.

Candidates who demonstrated practical knowledge of using a material were often able to access the standard better than those who had not used a material.

ACHIEVEMENT

Candidates awarded Achievement commonly:

- described the relevant composition and structure of a material
- described properties of the material related to composition and structure
- described a manipulation which is carried out on a material e.g. dye, drill, glue, bend etc.
- described how the composition/and or structure/ properties helped or complicated the manipulation
- related composition/structure to manipulation and function.

NOT ACHIEVED

Candidates who were awarded Not Achieved commonly:

- reported upon practice not related to the standard
- followed a given template which produced responses that required little depth or detail depth or detail
- were able to described the composition, structure and performance properties but struggled to show understanding of how the structure of materials impacted the manipulation of the material
- used information about manipulation e.g. colouration, dyeing of a material but showed little understanding shown of how the materials makeup affected this process

- focused on products and function e.g. school furniture, motor bikes, steering systems, however did not focus on a specific material related to the product and therefore couldn't explain how the materials composition and structure impact on manipulation, and function.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- compare and contrasted techniques for more than one material and made decisions relating to product function that reflected the information researched
- related in depth composition and structure to performance properties
- explained the cause and effect of the material composition and structure in material manipulation.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- related specific detailed information about a material they were evaluating related it to material manipulation and function
- compared and contrasted materials to predict changes to products as a result the materials' composition/ structure properties and manipulation
- related changes in product function to different manipulations of a material that made use of or allowed for the material's composition/structure
- related finished products fitness for purpose to composition/structure and manipulation.

STANDARD REPORT

91050 Demonstrate understanding of the role of subsystems in technological systems

COMMENTARY

For 91050 candidates were required to demonstrate their understandings of the role of subsystems in technological systems. Candidates chose from a number of alternatives and wrote reports that communicated their understanding often using diagrams or pictures to assist their explanations.

ACHIEVEMENT

Candidates awarded Achievement commonly:

- selected a single appropriate technological system
- identified at least two subsystems within the technological system
- described the roles of at least two subsystems
- described how these subsystems worked together to make the overall system function.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- identified subsystems in a technological system and described their roles, but, failed to describe how these subsystems worked together
- described non technological systems such as organisational or management systems
- used their own electronic circuits as the basis for the report and submitted lengthy explanations of how the circuit worked at a component level but did not describe the roles of the subsystems within their circuit.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- explained how specific control functions were performed between various subsystems in a technological system
- had a correct understanding of feedback and explained how control information was taken from an output subsystem back to an input subsystem to control, adjust or regulate the behaviour of the system
- explained at least two advantages and two disadvantages of at least one subsystem within the technological system.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- discussed both advantages and disadvantages of at least one subsystem within a particular technological system through comparisons or by evaluating specific decisions made by technologists
- discussed all three aspects of design, development, and maintenance decisions made by technologists regarding subsystems and their implications on a particular technological system.

GENERAL COMMENTS

Candidates who based their reports upon existing, rather than their own electronic, systems generally did better because many candidates own practice seldom included the aspects of systems required to meet the standard.

A significant number of candidates used their own electronic circuits as the basis for their report. In many cases, this circuit contained no feedback path and so the candidate could gain no higher than an achieved.

A significant number of candidates failed to gain merit or excellence grades as their explanations of feedback, and in some cases control, were incorrect. Feedback in technological systems does not include how the system gives information about its operation to users of the system; feedback is a self-regulating feature of technological systems and occurs without human interaction.

Candidates who chose the personal computer as a system generally did not describe the interaction between the subsystems satisfactorily to meet the achieved criteria. Those candidates who did reach achieved failed to advance to higher grades as they expressed limited understanding of control and feedback within the subsystems of the computer.

STANDARD REPORT

91053 Demonstrate understanding of design elements

COMMENTARY

The two most common methods that allowed candidates to achieve the standard 91053 continued to be:

- a separate and standalone activity that was sometimes conducted as a class activity. Candidates often selected images/products from a range provided by the teacher
- evidence from a candidate's technological practice. This was often edited extracts from a larger folio.

A growing number of candidates critiqued and evaluated the use of design elements within other similar existing products and then compared it to their own technological outcomes. Candidates who did this were often more likely to gain Merit and Excellence.

Candidates did not achieve if they did not demonstrate an understandings of design elements. To do so candidates were required to 'critique' the use of design elements within a specified context. In most cases successful candidates either, described, explained and/or discussed how and why design elements had been used within images or products. Some unsuccessful candidates carried out a lot of in-depth research of design elements and included a large amount of 'reference material' but did not acknowledge sources, personalise, interpret and/or apply this material to their specific context(s).

It should be noted that 'cut and paste' and/or not referencing material did not automatically preclude a candidate from achieving, but often it was difficult to differentiate between teacher provided, downloaded and candidate produced evidence. In cases where a candidate's own work could not be 'clearly recognised' candidates seldom gained grades higher than Achieved. This was normally due to an inability to identify 'candidate voice' and the information not being contextualised nor used to inform 'candidate opinion' within later sections of the report.

It was identified that a growing number of candidates are presenting evidence that has an increased emphasis on the historical development of a product and/or a biography of a designer (cell-phones, 'the new look'/Dior, Frank Gehry etc.). It is noted that this structure does assist some high achieving candidates and this background knowledge is relevant and useful to the candidates learning. However, it does not always provide evidence for this standard and should not be the focus of the report. It is not until a candidate shows how the design elements have been incorporated within these designs, and how societal influences and perceptions of the times have affected how design elements have been applied and incorporated into the outcome are the historical elements relevant. Many candidates who focused on the product history instead of demonstrating an understanding of design elements were awarded not achieved.

Many candidates were supported by the use of 'focus questions' and 'scaffolding'. This strategy often allowed candidates to achieve, but also restricted some submissions, due to the questions asked. Whilst Q&A is useful for candidates many did not demonstrate in-depth or comprehensive understanding until they produced evidence independently. Achievement at the higher levels was often categorised by the ability to clearly identify candidate voice and opinion within the summary and conclusion of the report.

In-depth and comprehensive understanding was often characterised by a candidate's ability to communicate how the 'interaction' and 'blending' of different design elements impacted on the quality of a product(s) or image(s). A common report structure often critiqued individual design elements within context(s) prior to a report summary and/or conclusion. It was in the later stages of the report where many candidates were able to present evidence that clearly met Merit and Excellence requirements. It is also an area where a number of 'scaffolded programmes' could be enhanced and allow a greater level of candidate voice, and justified opinion.

Many candidate submissions did not meet the literacy requirements for this standard. It is often not possible to 'describe' the application of design elements within a context sufficiently by solely using bullet points and abbreviated sentences. In some cases candidates would benefit from a 'word bank' that contains a list of conjunctions and connectives (starting words and linking words) that are used to 'describe'. This could assist candidates to phrase answers that more accurately communicate their knowledge to meet standard expectations.

ACHIEVEMENT

Candidates awarded Achievement commonly:

- identified and described how design elements had been applied within their own, or others practice and contexts
- identified and described both the subjective and objective considerations within a specified context
- described how the design elements contributed positively and/or negatively to the quality of the design.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- analysed a product which did not give the candidate scope to demonstrate an understanding of design elements
- interpreted design elements incorrectly and in turn showed limited understanding
- submitted evidence that reflected the design process rather than design elements e.g. key stages, materials, manufacturing methods, design ideas
- provided design element definitions without applying them to a context
- submitted a report which commented broadly on the historic developments of a product with little description of the way specific design elements had been applied and underpinned the choice of context
- submitted large quantities of 'supplied and/or non-referenced information' that the candidate had not processed/personalised or applied to the context
- presented evidence that did not meet quality and quantity expectations. It was uncommon for a candidate to display the breadth and depth of understanding in a submission of 1–2 A4 pages.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- identified, described, and explained how design elements had been applied to the context(s) chosen
- compared, contrasted and evaluated the application of design elements, either within their own practice or the practices and outcomes of others
- explained how specific elements had been applied to improve the aesthetics and/or function of a product
- showed the development of a product by the application of design elements and analysed the impact of design elements on the product.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- demonstrated independent research, design, and on-going and reflective analysis within their practice
- compared, contrasted and evaluated the application of design elements, either within their own practice or the practices and outcomes of others and often discussed how the interaction of different design elements impacted on the quality of the design
- showed accurate and comprehensive understanding of design elements and why/how they contributed to the quality of the product/s.

STANDARD REPORT

91070 Demonstrate understanding of basic concepts of information

COMMENTARY

Candidates in 91070 who clearly demonstrated understanding of basic concepts of information management wrote using specific examples of their own practice, providing evidence from their own work and experience to support any factual or referenced material. Furthermore, it was evident that the Successful candidates often developed their report based upon internally assessed units of work completed throughout the year. Reports that were less successful were often based upon a one-off research assessment task.

Candidates who relied heavily on NZQA exemplars, Internet sites, commercially available resources or teachers notes, often did not relate their information to their own practice nor provide evidence based on their own work throughout the year. Reports that only included referenced material without subsequent discussion or relating of the referenced material to their own practice, often did not demonstrate understanding.

Candidates who plagiarised did not clearly demonstrate their own understanding and earned Not Achieved grades. Candidates must understand that nominally changing sourced material using synonyms for key words or re-ordering the sentence structure does not constitute presenting their own work. Many candidates did not attempt to correctly reference or did not include any references for sourced material. Work presented as if it was the candidate's work when it was clearly not the candidate's did not demonstrate understanding.

Candidates developed using prescriptive templates often did not demonstrate in-depth or comprehensive understanding and rarely earned Achievement with Merit or Excellence. Templates that provided too much pre-generated or supplied content, limited the candidate's ability to demonstrate their own understanding or provide their own relevant examples.

Candidates who defined all of the operating system provided as examples in the standard's explanatory notes disadvantaged themselves. Candidates who defined each type of operating system often relied heavily on Internet sources and tended to provide verbatim definitions with no attempt at describing an operating system's key features or explaining the purpose in their own words. Effective reports focused on describing the key features and explaining the purpose of the operating system(s) that the candidates were familiar with using in their classwork or at home.

Candidates were not advantaged by providing the purpose and key features of every software application they are familiar with or every file type in existence. Effective reports focused on the specific software applications and file types that candidates utilised to produce projects during their years' work in a digital technology course.

Annotated screen captures were an effective means of demonstrating understanding. However, they should be cropped to show just the essential evidence to back up the description. It is not necessary to include the entire window. In addition, the screen captures should be of sufficient clarity so the details are evident and the annotations relate to the screen capture. Effective screen captures were the candidate's own and not sourced from the Internet or provided by the teacher.

It is not necessary to submit actual outcomes produced in conjunction with the report (e.g. recipe books or brochures).

Threats to data and ethical issues are best described in terms of how they relate to the candidate's experiences in creating their own digital information outcomes. Verbatim definitions of copyright law, privacy principals, viruses, spyware, etc. without discussion in relation to the candidate's own practice did not provide evidence of understanding.

ACHIEVEMENT

Candidates awarded Achievement commonly:

- identified an operating system and provided a general description of 2–3 key features of the operating system that they had utilised
- identified at least two common software applications and provided a description of more than one key feature of each software application that they had used
- described logical procedures for structuring and naming files and folders with reference to their own file management procedures
- described a common technique used for compressing files
- described procedures to manage threats to data such as installing virus protection software or performing regular back ups
- described more than one ethical issue related to information management such as piracy, privacy, or plagiarism
- provided some annotated screen captures as evidence of their understanding of operating system key features, application software key features and/or file management procedures
- wrote a majority of the report in their own words and provided a simple reference list for information retrieved from outside sources.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- used information directly from Internet sites, commercially produced resources, NZQA exemplars or teacher notes without processing the information into their own words or referencing sources
- completed teacher provided templates but did not demonstrate their own understanding
- omitted one or more of the key standard criteria (operating system key features, application software key features, file management procedures, ethical issues related to information management)
- provided lists of key features of application software or operating systems with no related descriptions
- provided brief definitions of application software or lists of outcomes that might be produced using the software without related descriptions of the key features of the application
- provided a rote definition of an operating system without related descriptions of the key features
- provided verbatim definitions of copyright law and the privacy act with no demonstration of understanding of the concepts
- provided step-by-step procedures relating to file management or use of application software without a purpose for performing the steps or descriptions of the key features

- submitted a digital information outcome, such as a recipe book or brochure, with no supporting evidence of their knowledge
- submitted evidence which was unrelated to the standard such as detailed computer hardware comparisons or computer hardware purchasing recommendations
- did not relate the information presented in the report to their own work either through descriptive examples or annotations
- provided overly referenced reports without interpretation or explanation of the referenced material.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- explained the purpose of an operating system and related their descriptions of the key features to the operating system's purpose
- explained how they utilised an operating system's key features in their daily work by providing descriptive examples or annotated screen captures
- explained the purpose of a range of software applications and related their descriptions of the key features to the application's purpose
- explained how they used the key features of application software to enhance, create or edit their own outcomes by providing descriptive examples or annotated screen captures
- explained the purpose and importance of adhering to good file management procedures with reference to procedures and conventions they applied in their own work
- explained the purpose of file compression and how they utilised file compression techniques to facilitate exchanging files, enhance an outcome or protect files
- explained a range of threats to data and how to manage the threats, including reference to storage devices they used for backing up important data
- described the concepts of privacy, file security, copyright or appropriateness of material in relation to their own work
- demonstrated clear candidate voice throughout the report and provided references for material used from outside sources.

ACHIEVEMENT WITH EXCELLENCE

Candidates who were awarded Achievement with Excellence commonly:

- comprehensively explained a range of examples which demonstrated how the operating system and the application software interacted whilst they were creating an outcome or performing a task
- justified why they chose a software application to perform a task or complete project, linking the justification to the explanations of the key features of the application
- justified the selection of a software application to perform a task by comparing their choice with alternative options, linking the justification to the key features available in each application
- provided justification for use of a particular file type for a specific purpose, by comparing and contrasting related file types which could have been utilised, most often in relation to projects they had completed
- demonstrated comprehensive understanding by providing detailed exemplification of concepts in relation to their own work.

STANDARD REPORT

91074 Demonstrate understanding of basic concepts from computer science

COMMENTARY

Every effort was made to ensure pages of reports are read in the intended order. This could not be guaranteed where a candidate did not staple their report as required in the specifications.

Every effort was made to ensure that a candidate's identity was not known to the marker. This was not possible where candidates had written their names on their report.

Every effort was made to ensure the security of candidate reports by requiring candidates to write their NSN on the top right hand side of each page of the report. Candidates who did not write their NSN as required created an unnecessary risk.

Candidates whose report was printed in a font size less than the specified font size and whose submission size approached the maximum number of pages were disadvantaged by this decision

Candidates, who did not acknowledge copied text at the place in the report where the text was used, disadvantaged themselves by that decision.

Candidates who provided code or screen shots that were too small were disadvantaged if it cannot be read it cannot be marked.

Candidates who used the work they did to produce a specific outcome, for example a sorting process, and reflected upon this in their report generally demonstrated understanding. Candidates whose reports used concepts relevant to the specific context of their own experience and used examples drawn from the specific context of their own experience generally demonstrated understanding.

Candidates who relied upon a thesaurus to substitute words into text did not demonstrate understanding. Reports that were completely generic often did not convince the marker that the understanding demonstrated was actually the candidate's own. Sections of reports completed as class activities often did not convince the marker that the understanding was the candidates own. Candidates who relied heavily on information provided from model answers or commercial resources inserted into templates generally failed to demonstrate understanding. Reports that were constructed as answers to closed questions often did not convince markers that the understanding was the candidate's own. Candidates who relied heavily upon the reproduction of teacher notes or material from commercial sources generally failed to demonstrate understanding. Candidates who wrote in their own voice using their own words about things they had done and understood generally demonstrated understanding.

In producing the Algorithm section of the report, candidates who provided photos of their own sort process coupled with an explanation of what they had done often succeeded. Candidates, who described first iteration through loop and then said "and so on", did not describe the whole process in their example. Clear distinctions need to drawn between sort algorithms and search algorithm. Candidates appear to consider sorting and searching as the only algorithms possible. Candidates were often loose in their use of

terminology, “a programme is a collection of algorithms’, informal instructions is pseudo-code…” Informal instructions imply assumed knowledge and programmes are written in a formal programming language. Candidates need to describe/explain personal examples to demonstrate their understanding of these concepts.

Candidates using programmes for comparison of costs for sorting algorithms need to reference the source, and give explanation/conclusions in their own words to demonstrate *their* understanding.

When using graphs the axes must be determined, as must the data source. An explanation of how the data was produced and an interpretation of its representation is also required. The graph by itself is simply an image. If colour is used for reference in graphs, then work should be printed in colour.

When sorting an absolute minimum of five items is required. Both small and large numbers should be used for comparison of sorting algorithms. When a sort is, being described a clear description of context and process is required.

Candidates who used better examples of a high-level programming language than HTML were often advantaged. Some candidates put forward the incorrect assumption that Scratch is a low-level language.

Candidates who understood the difference between usability and familiarity were advantaged. These candidates were often able to consider the subtle differences between user friendly, usability, ease of use, user experience.

ACHIEVEMENT

Candidates who were awarded Achievement demonstrated the required understanding. They commonly:

- described the roles of algorithms, programmes and informal instructions
- described an algorithm for a task in their own words, showing understanding of steps in an algorithm
- discussed the concept of cost for a specific algorithm of a particular size
- described some characteristics of programming languages such as syntax, input and output statements, control structures, storage, with reference to their own experience and examples
- described roles of levels of languages with reference to humans and computers
- mentioned high level language, low level language and compiler in correct context
- described the usability of the interface of a computer or electronic system showing understanding of the user interface and not just features of the device or programme.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- lacked detail in their discussion of the concepts of algorithms, programmes and informal instructions
- were unable to describe an algorithm for a specific task in their own words
- paraphrased text without understanding
- were confused in their description of the programming languages

- described features and functions of devices or programmes without discussing the user interface.
- described only one or two of the concepts.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- explained in their own words the distinctions between algorithms, programmes and informal instructions
- generated their own description of an algorithm
- used their own work to show understanding of the sequential, conditional and iterative structures in an algorithm
- discussed with in-depth understanding the cost of an algorithm
- explained in detail and in their own words the importance of the roles of high and low level programming languages
- explained the need for translation between high and low level programming languages
- explained how different factors of a user interface for a device or programme in their own experience contributed to the usability of the interface, and not just the usefulness of the programme or device.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- compared and contrasted the concepts of algorithms, programmes and informal instructions, in their own words and examples
- compared the cost of two different iterative algorithms in terms of steps required for the same problem of the same size of input data
- compared and contrasted the levels of programming languages and the different ways that high level languages are translated into machine languages, relating accurately to their own work
- compared and contrasted related interfaces to illustrate how different factors of an interface contribute to its usability
- used personalised explanations and contextually sound language
- explained in depth and detail with own words giving student voice to demonstrate comprehensive understanding.