National Certificate of Educational Achievement

2012 Assessment Report

Technology Level 2

COMMENTARY

91358

Generally, candidates presented their work in a suitable manner. Most schools provided candidate submissions on A4 pages within the 14-page limit. Some schools still used A3 paper – it should be that A3 paper should still be within the 14 x A4 paper limitations. Only the first 14 pages of evidence of a large submission can be marked. There were no submissions with CDs or flash drives/memory sticks. Most submissions were computer generated using the correct font size (12) as per the assessment specifications for this standard; however, there were some submissions that were handwritten and were more difficult to read.

While most reports showed understanding of technological modelling, some candidates did not show understanding of how technological modelling supports risk management.

Templates provided by schools were largely been adapted from the exemplars provided on the NZQA website. Where the requirements were correctly interpreted, the use of templates made it simpler for candidates to address the evidence requirements of this standard. However, restrictive templates limited the degree of detail of evidence that the candidates could provide. In some cases there was too much direction given with very specific questions that restricted the candidate's response and diverted candidate response from the requirements of the standard.

The work submitted by some candidates within submissions, showed a marked similarity. Candidates must provide evidence that generated by them as individuals. Some candidates were able to use the generic provided information to show how this independently demonstrated their understanding. This was done well with supportive literacy prompts such as "What happened," "My opinion" or "What I think." This provided candidate submissions with their own individual "candidate voice" that showed they were able to process information to demonstrate understanding required for this standard. In relation to this, while group work can be a successful way for candidates to experience and engage in meaningful technological practice, schools need to ensure each candidate provides individually processed evidence to submit for external marking.

Some candidates tried to demonstrate understanding from case study context by surmising what would be the best course of action required rather than commenting on the evidence from the modelling process in the case study. This type of approach is more assumption or "guessitmation" rather than relying upon the modelling that was done. Candidates should be encouraged to comment on what technological modelling did happen and what that meant in relation to the requirements of the standard, rather than suggesting other technological modelling that the candidate considered would have been more appropriate.

There were many submissions that started with a general approach to define what is technological modelling and its role in supporting risk management. While this information is useful for candidate overall understanding of the requirements of the standard it is important that subsequent evidence is presented within a specific context such as the candidate's own technological practice or references to a specific case study focusing upon technological modelling used to support risk management. Some candidates referred to case studies and related this to their own practice to demonstrate their understanding. In some submissions, it was the evidence presented in the candidate's own practice that met the requirements of the standard rather than the evidence presented from a case study of a technologist's practice.

Some case studies used for evidence were not suited to the requirement of the standard where candidates discussed the general practice of the technologist rather than identifying and demonstrating understanding of the technologist's modelling and how it was used to support risk management. Candidates were disadvantaged if a case study or their own technological practice did not mention the input and impact of stakeholder's feedback related to technological modelling to support risk management.

Other candidates did not meet the standard as they did not provide evidence of how their identified technological modelling supported risk management.

There were some submissions that identified risks within technological practice but did not clearly link the risk to the technological modelling carried out to manage the risks. These identified risks tended to be physical risks such as safety in the workshop, food hygiene and cross contamination or environmental risks such as the sustainability of materials used in practice. While these risks need to be considered it is important for candidates to show their understanding of how different forms of technological modelling to different stakeholder groups will help to manage these and other risks to decide what 'should' and 'could' be done at each stage of technological practice.

Some submissions identified other evidence or strategies to support risk management. For example, within an ICT context candidates identified planning tools, within a food context candidates identified a HACCP chart, and within a materials context (hard and soft) risk management charts as ways to manage. These were often not clearly identified as modelling or linked to forms of technological modelling. Nor was there an explanation of how they were used to gain feedback from key and wider stakeholders. Often there was no explanation of how these strategies were used to decide what "should" and "could" be done at identified stages of technological practice to minimise risk.

STANDARD REPORT

91358 Demonstrate understanding of how technological modelling supports risk management

ACHIEVEMENT

Candidates awarded Achievement commonly:

- described different types of technological modelling (e.g. brainstorm ideas, mindmaps, sketches, current market product research, concept drawings, working drawings, test pieces, mockups, toiles, prototypes and how these were used to support risk management
- identified types of risks (for example, resources such as expertise, time, money, correct equipment; safety concerns; design concerns; stakeholder needs; material suitability; and ensuring fitness for purpose) within identified forms technological modelling
- identified at least one stakeholder other than the technologist (for example, parents, friends, classmates, teachers, experts, focus groups) involved with their or other's practice and their requirements for the proposed outcome
- showed an understanding of the need to model the proposed outcome at different stages of technological practice with stakeholders for a successful outcome
- explained the use of technological modelling in the management of risks
- described stakeholder consultation and feedback linked to different forms of modelling which was used to identify and minimise risks in the development of a potential technological outcome

- described subsequent design changes that had to be made to ensure that identified risks are managed in the development of a fit for purpose outcome
- described forms of technological modelling in relation to what ‘should’ and ‘could’ be done to ensure the proposed outcome is fit for purpose.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- described technological modelling without identifying risks or how this modelling would support risk management
- described technological modelling from technological practice without any mention of stakeholders other than the technologist (from a case study or their own practice)
- identified risks within the classroom situation (for example, workshop safety, cross contamination) but with no link to technological modelling used within technological practice
- described technological modelling and how it supports risk management within a generalised manner (for example, generic technological definitions) rather than within a specific context/s
- formatted material such as case studies and generic definitions that did not convey individual candidate evidence to demonstrate understanding.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- explained different forms of modelling, the stages where these were applied and why, as well as explaining the type, severity and probability of risk that is supported by each type of modelling
- demonstrated understanding of why different forms of modelling at the different stages required reflection on what “should” or “could” be done to ensure fitness for purpose for the success of the outcome
- explained how evidence provided by different types of modelling with consultation and feedback from stakeholders other than the technologist (or themselves) supported risk management.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- provided an in-depth discussion of how different forms of modelling is used to provide a two-way communication between technologist and a range of stakeholders at different stages of technological practice to provide valid and reliable evidence to support risk management
- provided context specific examples throughout their report at various stages of modelling that analysed the differences in modelling used and why it was used with different stakeholders
- discussed design changes made following consultation and subsequent feedback from a range of stakeholders (key and wider stakeholders) to support risk management
- demonstrated a reflective approach to their risk management by discussing the interaction between stakeholders and technological modelling with practice to provide an effective outcome
- demonstrated evidence of risk management in a wider context of economic, social and political and environmental factors.

COMMENTARY

91359

Candidates who were successful often related material testing to their own technological experiences. This was particularly true when the candidate related the evaluation to a project that had been on going throughout the year.

Candidates who related materials research to their own experiences often succeeded in demonstrating understanding.

STANDARD REPORT

91359 Demonstrate understanding of the role of material evaluation in product development

ACHIEVEMENT

Candidates awarded Achievement commonly:

- researched materials to explain their performance properties and related them to the specifications required for a specific product
- described material evaluations and related the results gained to a specific products
- described how the information gained from the evaluations (either their own or researched) supported the selection of a specific material for a specific product
- used their own words throughout the report relating information about specific material for a specific to their own experiences to demonstrate understanding.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- explained the performance properties of the materials they had selected but did not do anything with the information gained
- researched case studies that had no evaluation procedures to determine the suitability of the material for the product
- researched case studies that had no product
- provided downloaded information without explanation or use
- included an excessive amount of information not relevant to the assessment
- presented **nothing on techniques that underpin material selection**
- identified knowledge that was not applied or connected in any way to a product
- identified valuations not linked to a product
- included recipes, that did not include a lot of testing and the recipe had little relevance to the final product
- included a description of the product e.g. a recipe or a menu without relationship to the modelling required.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- included a good explanation of the performance properties of the materials to be used and explained how these related to the product requirements
- explained how the testing informed the material selection for the product

- included accurately detailed explanations of how the modelling informed their knowledge of the suitability of the materials that were selected
- used case studies that enabled explanations of how the modelling had impacted on the outcome that was being produced.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- clearly understood the how and why of a range of modelling processes
- moved their explanations to discussions by relating the modelling information to the design of their outcomes and the impacts on ongoing function
- discussed the maintenance of the outcome (either theirs or a case studies)
- discussed disposal considerations
- demonstrated a full understanding of the relationship between the performance specifications and material testing and why they chose what to use what they did.

COMMENTARY

91360

Candidates were required to demonstrate their understandings of redundancy and reliability in technological systems. Candidates chose from a number of alternatives and wrote reports that communicated their understanding, some using diagrams and images to support their explanations and discussions.

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

Information regarding the design and maintenance aspects of technological systems is not always available on the internet or always obvious to the candidate. When choosing systems candidates need to make sure that they have access to all the information they need. Design and maintenance aspects may include the following: automatic detection and indication of errors, systems that can automatically correct errors, regular servicing carried out by personnel, extra reliability or redundancy to avoid human input.

STANDARD REPORT

91360 Demonstrate understanding of redundancy and reliability in technological systems

ACHIEVEMENT

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

- selecting an appropriate technological system or systems to report on
- described the application of redundancy to a specific technological system
- described the application of redundancy to a specific technological system
- had a clear understanding of redundancy as duplication of function
- had a clear understanding of reliability as consistency of function
- described the social, cultural and or environmental importance of reliability and redundancy.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- had an imprecise understanding of a technological system; sometimes candidates reported on organisational systems such as people making backup copies of data or carrying out procedures of technological systems such as maintenance
- copied too much material from the other sources and in doing so failed to show their own understanding
- reproduced a great deal of technical detail without linking it to redundancy or reliability
- wrote in general terms about redundancy and/or reliability without linking it to a specific technological system.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- explained why decisions regarding redundancy were made in the development of a specific technological system
- explained why decisions regarding reliability were made in the development of a specific technological system
- candidates made the links explicit in the development stages of a specific technological system to redundancy and reliability.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- discussed how redundancy implications impact on design decision making
- discussed how reliability implications impact on design decision making
- discussed how redundancy implications impact on maintenance decision making
- discussed how reliability implications impact on maintenance decision making
- gave detailed information that justified their explanations, sometime using comparing and contrasting. These detailed justifications included aspects such as: standardisation of components, miniaturisation of components, ease of repair, system self-maintenance, reducing maintenance, modularisation, system self-detection of errors, system self-correction of errors.

COMMENTARY

91363

A broad range of case studies, contexts and technological areas were to present evidence. The two most common methods that allowed candidates to access the standard were:

- a separate and stand-alone activity that was sometimes conducted as a class activity in which candidates often explored products provided by the teacher
- evidence from a candidate's technological practice, often edited extracts from activities that analysed existing products, and on-going evaluation of a candidate's practice and outcomes.

Candidates achievement at the higher levels was enhanced by prudent selection of the case studies and contexts studied. Many of these candidates also critiqued and evaluated their own technological outcomes and compared it with the practice of others. This model also allowed candidates to transfer and apply their new knowledge. This created a greater level of candidate voice and convincing range of divergent evidence.

Successful candidates often researched the 'cradle to grave' or 'grave to grave' Lifecycle Analysis (LCA) of a product and then superimposed the 'Sustainability Venn Diagram' over this to identify issues that impacted on their designs and the designs of others. It was the areas of economic, societal and environmental 'overlap' that allowed candidates consistently to produce evidence that enabled them to gain Merit and Excellence grades.

STANDARD REPORT

91363 Demonstrate understanding of sustainability in design

ACHIEVEMENT

Candidates awarded Achievement commonly:

- identified, described and explained how lifecycle considerations determine the focus for design interventions
- identified, described, and explained the relationships between lifecycle, innovation, and sustainability
- presented information on the relevant elements of economic, environmental and social factors and discussed how these three factors enable a product or a system to be sustainable
- showed understanding of the relationship between lifecycle analysis, sustainability, and innovation within a developed outcome.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- downloaded and/or obviously reworded large amounts of text directly from other sources without evidence of further processing or interpretation. This lacked candidate voice, interpretation, and/or application so that the candidate was often unable to demonstrate understanding
- interpreted the standard to be a study of how materials are 'produced'
- interpreted the standard to be a study on recycling

- answered scripted questions that often constrained candidates' ability to explain and demonstrate
- covered the Life Cycle Analysis in-depth but did not address innovation or sustainability and how these three combined and impacted on 'design'
- investigated a case study or product unrelated to their practice
- provided written evidence that was overly brief, and commonly in the form of bullet points and/or abbreviated sentences, that often 'identified' and 'described' but did not 'explain'.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- displayed strong links between case studies and their own practice
- described and explained in-depth how lifecycle analysis is undertaken and how this determines the focus for design intervention
- described and explained in-depth how issues identified by lifecycle analysis led to design innovation being applied in the development of a sustainable technological outcome
- evidence reflected a 'considered candidate voice' resulting from a detailed LCA
- transferred new understandings from initial LCA to enhance own practice and the development of a sustainable outcome
- included in-depth analysis of social, economic, and environmental factors that enabled discussion and exploration of these factors on a product's design sustainability
- had been given opportunity to investigate authentic sustainable design practice that related to their own practice
- used a range of visual communication methods to explain the links between LCA, innovation, and sustainability.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- demonstrated strong links between case studies and an individual's technological practice
- explained and discussed the three components of sustainability comprehensively and clearly articulated the reason for design intervention and ensured sustainability in design
- presented a logical and high quality report that was easy to interpret and therefore 'fit for the purpose'
- identified, discussed, and explored the issues, tensions, dilemmas, and compromises related to both LCA and sustainability of a design
- compared and contrasted differing approaches to achieve design sustainability
- had completed the report over time; allowing the new understanding to consolidate within candidate's own practice.

COMMENTARY

91367

Candidates should clearly reference throughout their report and supply a Bibliography.

Many Not achieved reports did not link to an organisation at all.

When writing about Attribution and Creative Commons many candidates wrote what these were rather than linking these to a specific organisation. Also when reporting on the different methods of backups successful candidates discussed the current method used for backup etc. in a specific organisation's system and then discussed whether other alternatives were suitable and if so why. Less successful candidates stopped at defining, with no link to a specific organisation.

Many candidates reported on organisations, for example, Facebook, without enough knowledge to be able to address the standard.

Some candidates chose to report about two organisations. This often caused confusion in their reports often leading to inadequate coverage of the standard.

Candidates who followed templates that did not allow them to achieve were disadvantaged. Unsuccessful templates did not provide spaces for the required coverage, produced closed answers, or were clearly linked to supplied answers. Candidates who relied upon templates often did not really rely upon their own understanding.

Candidates who used templates from commercial sources were often severely disadvantaged as the level of guidance provided often prevented any demonstration of candidate understanding

STANDARD REPORT

91367 Demonstrate understanding of advanced concepts relating to managing shared information within information systems

ACHIEVEMENT

Candidates awarded Achievement commonly:

- provided information to cover the criteria
- used a single specific organisation to generate examples
- referenced the organisation's acceptable use policy and provided examples from the specific organisation
- referenced the Privacy Act and some or all of the 12 Privacy Principles and linked this to examples drawn from specific organisation
- explained collaboration on shared files giving examples based in a specific organisation
- explained the role of a specific shared information system by describing how components e.g. hardware, software, data, procedures, and people interact using examples from a specific organisation
- included annotated diagrams to describe the information system e.g. backup system, file management system.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- produced generic reports that did not state the role of an information system and did not relate the information system to a specific organisation
- did not provide adequate coverage of all five areas
- presented unchanged or minimally changed material from Internet sites rather than displaying their own understanding
- wrote on how to use Facebook rather than investigating the organisation itself under the provided criteria of the Standard
- used bulleted lists but did not expand on this
- used evidence from course materials in a manner that demonstrated that they did not understand.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- discussed ethical and legal issues related to shared information using examples drawn from a specific organisation
- explained the implications of back-up procedures and conventions for information systems using examples drawn from a specific organisation
- discussed the advantages and disadvantages of an information system for managing shared information using examples drawn from a specific organisation in an organisation
- effectively used any source material and referenced it at the point of use.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- evaluated procedures and conventions for privacy and permissions used using a range of examples drawn from a specific organisation
- evaluated the back-up procedures and conventions for information systems using examples from a specific organisation
- evaluated the effectiveness of an information system for managing shared information within a specific organisation
- effectively incorporated any source material and referenced it at the point of use.

COMMENTARY

91371

Candidates who clearly demonstrated understanding of basic concepts from computer science wrote in their own voice, providing evidence from their own work and experience to support any referenced material.

Candidates who simply reproduced information from sources such as Internet sites and teacher notes often did not demonstrate their own understanding.

Reports that reproduced supplied or sourced material without relating the identified knowledge to a specific context such as a digital device often did not demonstrate understanding.

The use of annotated photographic and diagrammatic evidence developed to demonstrate their understandings assisted candidates to achieve. Photographs and diagrams presented as evidence without specific annotation often did not demonstrate understanding.

In considering human computer interfaces, some candidates confused functionality of devices with usability. Some candidates did not refer to the usability heuristics.

Some reports followed the exemplar too closely with just minimal changes of the data. This practice did not contribute to an Achieved grade.

Candidates who produced well-formatted documents particularly well formatted code and screen shots were advantaged as this assisted the markers to establish clearly candidate understanding.

Candidates were disadvantaged where evidence for the standard was presented in a report longer than the specified 14 pages.

STANDARD REPORT

91371 Demonstrate understanding of advanced concepts from computer science

ACHIEVEMENT

Candidates awarded Achievement commonly:

- described ways in which different types of data could be represented using bits, such as text, colour, audio, numbers and images
- described the concept of encoding information using compression coding and typical uses such as images and audio
- described the concept of encoding information using error control coding and typical uses such as parity and ISBN
- described the concept of encoding information using encryption and typical uses such as Caesar Cypher
- provided examples from human-computer interfaces, such as a chosen device, and described how they illustrated usability heuristics.

NOT ACHIEVED

Candidates awarded Not Achieved commonly:

- copied material verbatim from other sources (particularly the internet) and, in doing so, failed to show their own understanding
- copied material verbatim from other sources and did not differentiate between copied data and their own understanding
- described only one or two of the three required concepts
- lacked detail in their descriptions
- attempted to paraphrase without understanding
- described features in their chosen device but did not answer the questions in the standard
- used the allowed pages unnecessarily with cover sheets or extensive printouts of device specifications or tables of data from the Internet.

ACHIEVEMENT WITH MERIT

Candidates awarded Achievement with Merit commonly:

- demonstrated in-depth understanding of advanced concepts from computer science
- compared and contrasted different ways in which different types of data could be represented using bits, such as ASCII and Unicode, and discussed the implications
- discussed how a widely used technology, such as ISBN, JPEG, or ZIP, was enabled by one or more of compression coding, error control coding, or encryption
- evaluated a given human-computer interface, such as a chosen device, in terms of usability heuristics
- used annotated photographic and diagrammatic evidence to demonstrate their understandings.

ACHIEVEMENT WITH EXCELLENCE

Candidates awarded Achievement with Excellence commonly:

- demonstrated comprehensive understanding of advanced concepts from computer science
- articulated their understanding in their own words and from personal experience
- evaluated a widely used system for compression coding, error control coding, or encryption
- suggested a number of relevant improvements to a given human-computer interface based on an evaluation in terms of usability heuristics.