



GENERAL COMMENTS

The 2003 Systems and Technology School-assessed Task (Units 3 and 4 Outcome 2) involved students in designing, planning, producing, testing and evaluating activities related to the operation and control of an integrated system or systems.

The School-assessed Task involves:

- developing a design and production plan
- implementing the plan (production work)
- diagnostic testing and analysing results
- maintaining a journal to record progress during production
- evaluating the system and production activities (interim and final reports).

Advice on management and organisation

Conditions which are conducive to student achievement in the School-assessed Task include well-managed, organised classrooms/work areas and provision of relevant technical resource materials. Teachers need to provide guidelines on the selection of appropriate tasks, timelines, due dates and the requirements of the task. Regular monitoring of progress is also important in supporting and encouraging students through their tasks. Planning and preparation of good interim reports assists students in remaining focused on their work throughout the duration of the task. Structuring the task through the above stages is useful and timelines may be set to assist students.

Teachers should document skills and competencies related to Criterion 3, 4, 5 and 6 that may not be clearly demonstrated in the students' final presentation on the Additional Teacher Comment sheet. This is available on the URL www.vcaa.vic.edu.au/vcaa/vce/studies/systemtech/systemindex.html

Features of successful production work

A wide range of topics was explored in the School-assessed Task. Most students negotiated production topics with their teacher. They organised work plans, work processes and set goals for completion and evaluation.

Successful student work exhibited the following features:

- the production tasks were completed using a diverse range of work processes requiring a high degree of skill and knowledge
- design plans were thorough, detailed in depth and content with a range of design proposals or options; justifications were made for selection of appropriate options and developed solutions
- diagnostic tests were planned with expected and actual outcomes identified; a sound analysis of the test data was made and explained
- evaluation reports were thorough and discussed the production activities as well as the practical outcomes of the task
- production activities involved working on an integrated system, its subsystems, parts and components; appropriate steps were taken to control the system, its inputs, processes and outputs
- completed systems were operational and produced to a very high standard of assembly and finish
- work required a high degree of effort and time to achieve completed and operational status
- folio work was of high standard in content and detail; a range of communication techniques was used to present information and design work.

Types of products

Examples of successful production activities selected for the School-assessed Task were:

- making electromechanical toys and games
- building hydraulic lifting, moving and locking devices
- making controlled robot arms and vehicles
- building engine powered scooters, go-karts and mini bikes
- making controlled model houses, model hoists and bridges
- constructing model watercraft and aircraft
- performing motor vehicle engine conversions, assembly and tests
- making electromechanical alarm and warning devices for the home
- manufacturing and fitting car anti-theft devices and central locking systems

- wiring and setting of ignition and fuel systems on operating car engines
- making controlled light and sound systems
- constructing engine powered generators and motorised barbecue units
- making musical instruments such as keyboards and electric guitars.

Areas of strength and weakness

Many production tasks were of a high standard which reflected the emphasis on quality practical work. With few exceptions the products were integrated systems characterised by ‘input–process–output and control’ of integrated electrical, electronic and mechanical subsystems.

Teachers and students should note:

- most projects incorporated control of integrated systems; successful student production activities involved work on integrated systems with processes such as manufacture, repair, modification and assembly of elements and sub-systems within controlled operating systems
- high level evaluation responses involved students commenting on and evaluating their production outcomes by comparing the production plan with the actual outcomes of the production work plans, processes, modifications and difficulties encountered; interim evaluation reports were strongly featured in good folios
- technical data (obtained from the diagnostic test and essential relevant texts) was used to prove how well the system was performing
- design and planning work should be thorough and reflect requirements of the assessment criteria. Students should consider a range of possible ideas or options then select from these for further development. Justifications should be made for selecting what should be the most appropriate option. Students who produced both design and production plans with limited detail were disadvantaged as they had little documentation to refer to when assessing and evaluating their work and related planning activities
- some tasks did not involve the ‘control of a system’ as required for this task. As advised in the 2003 Technology Assessment Guide Unit 4 production work should involve working with an ‘operational integrated and controlled system’
- using commercially produced kits and working with simple or basic projects can disadvantage students as this limits the scope of planning and production activities; less complex kits are often suitable only as a subsystem of a larger integrated system
- some systems were not integrated; these systems were generally very simple to make and did not use a sufficient range of processes and skill level to achieve high grades. These tasks did not fully satisfy the task criteria for the product to be an ‘integrated system’ as they did not comprise mechanical and electrical or electronic subsystems
- some projects incorporated the use of 240 volt DC power supply which contravenes current school practices; a number of these products also displayed wiring faults such as bare connections or shortened earth wires; teachers should refer to advice on electrical power supply and related safety issues published in the February 2003 *VCE Bulletin* (pages 8 and 9).

A number of schools used commercially produced workbooks and/or pro formas. Materials of this kind can seriously limit students in developing a relevant and thorough folio consisting of detailed plans, tests and evaluations. For example, some only allowed a few lines for students to justify options or to complete an evaluation. Others only provide one page for each option and two or three pages for development work. Teachers are encouraged to develop their own project task guidelines. They could choose to base these on the task criteria and use headings linked to each criterion and related sub-criterion points.

Some teachers allowed students or class groups to produce the same or similar projects. Many of these activities were too basic for this level of study (e.g. servicing a lawn mower or assembling a basic alarm kit). When this approach is used, students’ design and development work is often limited in scope due to the confinements of the set task. This is reflected in assessment where high grades are rarely achieved. Students should be encouraged to propose and develop individual products of their own choice.

Teachers should refer to the *Systems and Technology Implementation Resource Kit 2001* and *Study Advice 2002*. Other material is produced and revised through the *Technology Education Association of Victoria (TEAV)*. The VCE Systems and Technology Study Design also assists with the School-assessed Task.

Diagnostic practice

Teachers should note that testing can be performed at any relevant stage of production, with final testing on completion of the system. Diagnostic testing directly relates to the production activity. It involves using test or measuring equipment to assess the performance of a system and its parts in terms of input–process–output and effective control. The data obtained as a result of the diagnostic testing is used to gain a greater understanding of the system, rectify problems or to measure its planned performance and to prescribed recognised standards.

Tests were usually performed:

- at the beginning of the task, in order to determine faults
- during the production task, as a means of testing a sub-system
- in most cases, at the end of the production activity to determine the outcome and operational effectiveness of the system.

SPECIFIC INFORMATION

Criterion 1 Skill in developing a design plan

High-quality work involved the production of a thorough design and planning folio. Good design work included consideration of a range of ideas with justifications made for selection of appropriate solutions. Students used a range of methods to communicate their ideas and plans including text, graphs, CAD, illustrations, CD-ROM and posters.

Criterion 2 Skill in preparing the production plan

Most students prepared a detailed plan for production that included lists of equipment and components needed for the task. Successful plans outlined in detail the stages intended to be used in production work.

Criterion 3 Skill in the application of processes

Production activities which received very high ratings exhibited a wide range of processes (usually five or more) and these were of suitable diversity and complexity. Students presenting simple projects containing limited production processes cannot rate highly.

Criterion 4 Skill in the use of tools, equipment and machines

Projects that demonstrated a high degree of proficiency gained high ratings for this criterion. The quality of soldering, drilling, machining, material preparation and assembly are examples where the competent use of tools, equipment and machines is demonstrated. Highly rated work exhibited components assembled to correct codes of practice or standards

Criterion 5 Skill in realising the plan

Projects should demonstrate similarities to the actual project proposal, design plan and any recorded modifications. The system should be complete and operational as planned.

Criterion 6 Understanding of appropriate diagnostic test procedures

Highly rated work identified the purpose and description of the test using appropriate terminology. Expected test outcomes were stated and supported by relevant technical data. Quality responses provided detailed and logical procedural steps for the test as well as identifying tools and equipment used. Possible sources of errors and methods of reduction during the test were stated. Low-scoring responses often did not identify potential errors or alternative test methods.

Criterion 7 Analysis of data gained from diagnostic testing

Students are required to present the data collected from the diagnostic test in a clear, identifiable, technically correct form using SI units where applicable. Most students presented the data using appropriate tables or charts. The source of the technical information was also identified. Very good responses presented an explanation of the actual result versus the expected result and identified the effect of errors.

Criterion 8 Evaluation of the effectiveness and efficiency of the design plan and production activities

The evaluation requires students to state the intended outcome and the actual outcome of the completed system and to make a reasonable analysis of these. Discussion should support judgments made about the production task such as the results from the planned diagnostic test and operation or performance of the final product. Students were also required to evaluate the sequence of operations of their production activities, comment on the nature of changes and identify safety concerns. Good work displayed a sound knowledge of all the above aspects.

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