Information Technology

2011 Assessment Report

Government
of South Australia

SACE
Board of SA

INFORMATION TECHNOLOGY

2011 ASSESSMENT REPORT

OVERVIEW

Assessment reports give an overview of how students performed in 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, the quality of student performance, and any relevant statistical information.

GENERAL COMMENTS

Student achievement in Information Technology is assessed in four assessment types: Assessment Type 1: Folio Assessment, Assessment Type 2: Skills and Application Tasks, Assessment Type 3: Project, and Assessment Type 4: Examination.

In all topics and programming environments (e.g. traditional, event-driven, multimedia-based, or website-based programming), the tasks students undertake should allow for manipulation and processing of data to produce components involving complex processes. The more successful student responses demonstrated procedures, sequencing, branching, and repetition (either program-activated or user-activated) so that, for example, a user can choose an item or action repeatedly. The program then processes data related to each choice to produce an outcome, such as how many attempts each player had, or to produce an invoice for a particular customer that shows items ordered and the total cost.

Students demonstrated achievement at the higher levels of the performance standards when they were provided with, and guided in, opportunities that involved concepts listed in the subject outline, such as iteration, incrementation (overall and in groups), and using an array. All option topics require an equivalent level of skill.

Students were more effective in the examination when they were able to apply knowledge to a scenario they had not seen before. This is a specific skill that requires development throughout the year. The best responses did more than identifying and recalling, given that students are able to take in handwritten notes to the examination. Teachers should provide students with opportunities to practice questions that apply design techniques, such as algorithms and desk-checks, and to be able to write reasonably detailed answers. Teachers should also network with others to develop resources that enable students to practice questions requiring the application of knowledge to scenarios and specific situations.

SCHOOL ASSESSMENT

Assessment Type 1: Folio

Folio assessments comprised at least three and at most five tasks. On average, four assessment tasks were developed, in accordance with the exemplars presented on the SACE website (www.sace.sa.edu.au).

The assessment tasks cover the core topics of Information Systems and Computer and Communication Systems and two selected option topics.

Students provide evidence of their learning primarily in relation to the assessment design criteria Knowledge and Understanding, and Analysis and Evaluation.

Evidence of assessment was presented in a range of forms, including case studies, essays on issues, videos of oral presentations, multimedia presentations, and tests.

It is important that teachers use the performance standards when they design tasks. For each part of a task the question should reflect the performance standard being assessed and teachers should indicate how the student performed against that standard. When teachers prepare the task design sheet for moderation, they should clearly label the concepts being assessed e.g. AE1 (Analysis and Evaluation, dot point 1) for each question and part.

Students who demonstrated achievement at the higher level of the performance standards in the case study went beyond a recount of an information system. Students who focused on one system (for example, Stock Take or Account Receivable or Overdue Creditors) were able to demonstrate discerning evaluation of the effectiveness and efficiency arising in an information system. Students were also able to demonstrate their knowledge of the impact of current and potential computer-based information systems and technologies on individuals, organisations, and communities.

In essay-based tasks students were able to demonstrate deep knowledge, responding to well-scaffolded questions to a word-limit of approximately 1000 words. Larger pieces of work did not necessarily result in higher levels of achievement. It is important for students to apply their knowledge to a situation or scenario and rather than directly recounting or auditing an information system. Students need to identify:

- how the elements of an information system relate to each other
- the strengths and weaknesses of each element
- how elements can be managed individually and collectively to fit the business model such an information system resides in
- how to meet legal requirements.

Assessment Type 2: Skills and Applications Tasks

Students undertake one skills and applications task for the option topic that includes a project, and two skills and applications tasks for the other option topic.

Teachers are reminded that the skills tasks are of a practical nature and to follow the requirements specified in the subject outline. The whole task does not have to be computer-based. It is expected that part of the task will involve aspects of the design of a system and be paper-based. The implementation part of the task will be a practical on a computer.

Past examination papers and the 2011 sample examination paper provide useful guidance for teachers. Teachers are also encouraged to network with others to find resources that have been used successfully in the past, which may include published resources.

Students provide evidence of their learning primarily in relation to the assessment design criteria Analysis and Evaluation, and Development and Validation.

A skills and application task should not include theoretical questions. Theory may be covered in a folio task, and teachers should also note that the examination paper does not include theoretical questions on options topics.

With two skills tasks in a single option topic, one would expect to see different skills assessed, for example, assessing students' ability to read and understand programming code in one task and, in the other, assessing their ability to complete a design/program with a skeletal provided. This also applies to all topics, for example, assessment that requires students to construct queries involves programming skills.

Each individual task should reflect assessment against the performance standards. With the task design sheet sent to moderation it is wise to clearly label the concepts being assessed, e.g. DV1 (Development and Validation, dot point 1) for each question and part.

Using different colours on the performance standards table for each assessment task is a good way to indicate overall student achievement against the performance standards for this assessment type.

Assessment Type 3: Project

For this assessment type students provide evidence of their learning in relation to the assessment design criteria:

- knowledge and understanding
- analysis and evaluation
- development and validation.

The project is a major component of this subject, as its weighting indicates. Teachers are encouraged to use materials that the SACE Board provides. For example, they can use skills checklists to help them mark student work and to discriminate between levels of student performance. Teachers should also reflect on the emphasis within the current checklists (not checklists from previous years) and should place no more than 10% emphasis on the appearance and usability of the user interface. Moderators emphasise processing and programming skills. Teachers should use and highlight the performance standards and indicate evidence of the standard in the body of student work.

To help with the process of moderation, program codes that students have developed must be available and project outcomes must be able to be validated on another computer, using the same methods as those used in the student's testing and evaluation of his/her computer-based system and in the teacher's assessment of the project.

The most successful projects focused on a system that met three or four specific outcomes, with each outcome covering the essential skills listed in the left-hand column and some of the right-hand column (where appropriate) in the skills checklist.

For example, when producing a relational database system it is vital that students undertake queries based across the transaction table of the database. One query should have one criterion with sorting; another should have multiple criteria combined with sorting; another should be statistical in nature, involving grouping and counting/averaging/summing, preferably with a criterion. Another query that involves criteria and sorting should be made into a database report with summary and grand summary. The main data-entry form must allow the user to input data required that meets an essential requirement of the system, for example, the lending of a book to a borrower. This requires greater thought about the purpose of a database system.

If a student chooses a programming topic for their project, one outcome should be based on the construct of condition (IF-THEN-ELSE-IF), one should involve iteration, and one should be based on outputting values that have been appropriately stored in an array, such as a high score table.

Students must undertake and complete outcomes that successfully produce results. To achieve this, students should concentrate on the left-hand column of the skills checklist and ignore the right-hand column until they have a system that has four solid outcomes. If students have enough time, they may undertake skills on the right-hand side of the checklist. Teachers are advised to concentrate on the left-hand column of the skills checklist when they check the appropriateness of outcomes.

For the programming option topics teachers should consider how the evidence of the assessment design criteria can be best demonstrated. This evidence and teachers' assessment of validation (testing the system against the student's validation plan) are required. The most effective responses used a table to indicate the objective, the required input, the expected outcome, and the actual result of the built system. This table was supported with black-box and white-box or grey-box testing of the system in a video. In general, documentation adhered to the 1500-word limit. Students are encouraged to print out only the code that relates to a documented outcome of the system.

Teachers are advised to refer to the support materials on the SACE website (www.sace.sa.edu.au). Teachers are also encouraged to network with others to find resources and examples of projects that have been used successfully in the past.

EXTERNAL ASSESSMENT

Assessment Type 4: Examination

Teachers are advised to concentrate on the basic concepts and skills in all topics covered in the external examination. They should also provide students with opportunities to develop a solid core of knowledge so that the students can apply that knowledge to understand what underpins scenarios presented in the examination.

Question 1

The mean mark was 12.08 (58%). Effective responses paid attention to the phrasing of the question. Some students explained the concepts about the use of the information system with appropriate detail, but more attention was needed on the issue of what would happen to the records in the database, in terms of inventory, when a car is sold. Thankfully few students mentioned the concept of security, which was not relevant to the question.

Question 2

The mean mark was 8.76 (52%). The parts of this question that involved identification were generally well answered, which was expected given that students were able to take handwritten notes into the examination. Students should practice responding to questions that require explanation of processes in relation to scenarios and those that include the components of an embedded system. Teachers should provide appropriate and critical feedback to students on whether their practice answers are appropriate to the terms of the scenario.

Question 3

The mean mark was 12.35 (52%). This question was about the transfer of data across the Internet. Teachers are advised to explain Transmission Control Protocol/ Internet Protocol (TCP/IP) in more depth, including the critical roles TCP/IP plays in the transfer of data across the Internet. Students need to show greater understanding about the contents of packets and the key concepts of the layered architecture of protocols, packet switching, and routing, particularly when a given communication medium is congested or not available (which occurs more frequently than is often considered).

Question 4

The mean mark was 4.06 (51%). Unfortunately there was less depth and clarity in answers as students moved on to the last dot points in the question.

Question 5

The mean mark was 9.29 (37%), with better responses reflecting a thorough grounding in constructs and syntax. Students need to understand when a *variable* is required to be used and when a programmer would use a *constant*.

Setting the examination requires comparable skills being examined across all programming based option topics. So, it is essential that students are able to develop basic programming skills, which includes generating random numbers, nested selection, iteration (looping), and using an array. These vital aspects of programming topics are important for students to do well in the examination. This comment is also relevant to questions 7 and 8.

Question 6

The mean mark was 11.46 (46%). Students should be able to identify the data that is redundant and why this is the case, and then to normalise the data into two (or more) tables. It then follows that a primary key field will be required in the primary table and a foreign key field on the many side to establish a join between the tables.

Students should expect to have to resolve a many-to-many relationship and that primary key fields and foreign key fields will be required, with a composite key likely to apply to fields in the transaction table. Responses for placement of fields and choice of data type were disappointing.

Teachers are advised to provide students with opportunities to study these concepts thoroughly, ideally including many exercises during the teaching and learning program and, for topics such as placement of fields in tables, to consider what entity data belongs to by asking the 'of' question. The most effective responses provided detailed explanations for the issues-type question about preventing data loss.

Question 7

The mean mark was 11.33 (45%), with the most successful responses reflecting a thorough grounding in Action Script and detailed writing of syntax as required. See also the comment above on the development of basic programming skills.

Question 8

With a mean mark of 7.44 (30%), students clearly found this question challenging, particularly the requirements to explain how the interface worked and to write appropriate code. See also the comment above on the development of basic programming skills.

Question 9

The mean mark was 6.59 (26%). Very few students chose this question, reflecting the fact that few classes undertake this topic. The question about the impact of the sports store's business was answered reasonably well.

Teachers are advised to provide students with opportunities for in-depth study of dynamic websites, to discuss at length the function of different software involved, and to write code that requests filtered data from the database.

Chief Assessor
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