

Computer Studies



**Seventh-day Adventist
Secondary Curriculum**

A Curriculum Framework for Seventh-day Adventist Secondary Schools

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First Edition

Dale Cowley
Michael Hale
Harry Halliday
Joy Hawke
John Oxley
Carey Smith
Peter Wallace

Lismore Adventist High School
Doonside Adventist High School
Murwillumbah Adventist High School
Lilydale Adventist Academy
Brisbane Adventist High School
Strathfield Adventist High School
Auckland Adventist High School

Second Edition

Kalvin Dever
Harry Halliday
Graeme Harris
Mark Vodell

Avondale Adventist High School
Tweed Valley Adventist College
Central Coast Adventist High School
Gilson College

It is our wish that teachers will use this document to improve their teaching and so better attain the key objectives of Seventh-day Adventist education.

Sincerely

Dr Barry Hill,
Director Secondary Curriculum Unit

South Pacific Division
Seventh-day Adventist Church
Department of Education
148 Fox Valley Road
WAHROONGA NSW 2076

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WHAT IS A FRAMEWORK?

A Framework

In the Adventist secondary school context, a "framework" is a statement of values and principles that guide curriculum development. These principles are derived from Adventist educational philosophy which states important ideas about what Seventh-day Adventists consider to be real, true and good.

A framework is also a practical document intended to help teachers sequence and integrate the various elements of the planning process as they create a summary of a unit or topic.

The framework is not a syllabus.

The framework is not designed to do the job of a textbook. Although it contains lists of outcomes, values, issues and teaching ideas, the main emphasis is on relating values and faith to teaching topics and units.

Objectives of the Framework

1. One objective of the framework is to show how valuing, thinking and other learning skills can be taught from a Christian viewpoint. The Adventist philosophy of computing studies influences this process.
2. A second objective is to provide some examples of how this can be done. The framework is therefore organised as a resource bank of ideas for subject planning. It provides ideas, issues, values and value teaching activities of computing studies, so it is intended to be a useful planning guide rather than an exhaustive list of "musts."

The framework has three target audiences:-

1. All computing studies teachers in Adventist secondary schools.
2. Principals and administrators in the Adventist educational system.
3. Government authorities who want to see that there is a distinctive Adventist curriculum emphasis.

USING THE FRAMEWORK

LAYOUT

The framework is comprised of four sections — philosophy, the planning process, sample unit plans, planning elements, and appendices. The nature and purposes of each section are set out below.

It is suggested that you read this page describing these four sections now before attempting to use the document for the first time.

SECTION 1 – LIFTOUTS SECTION

Section 1 is the philosophical section. This section contains a philosophy of computing studies, a rationale for teaching computing studies, and a set of outcomes which have a Christian bias.

The section is meant to help teachers refresh their memories of the Christian perspective they should teach from. It is termed "Liftouts Section" because teachers are meant to take elements of the section and cut and paste them into other places in their teaching resources where they may be useful. They may consult this section when looking at longer-term curriculum planning, and when thinking about unit objectives. They may also consider adapting it or using it as is to form part of their program of work.

SECTION 2 – PLANNING IDEAS – THE SEALED SECTION

Section 2 contains the key planning elements of the framework — the various lists of ideas, values, issues and teaching strategies that teachers may consult when working their way through the planning process outlined in Section 3 of the framework. This section is a kind of mini dictionary of ideas to resource the steps followed in Section 3. It is called "The Sealed Section" because ideas are what teachers want, and if the section title makes it appear that these ideas are difficult to access, then being naturally curious human beings, teachers may be more likely to refer to them.

SECTION 3 – The Planning Process

Section 3 is the "how to" section of the framework. It explains a process teachers can follow when planning a course or unit of work while thinking from a Christian perspective. The explanation of the planning process is followed by sample unit summaries compiled by working through the steps. Because it suggests an actual process for integrating ideas, values and learning processes, this section is really the heart of the document.

SECTION 4 – APPENDICES

Section 4 contains ideas for teaching which may lie outside the domain of values and faith, but which could be useful as reminders of good teaching and learning practice.

SECTION 1

The Liftouts

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PHILOSOPHY

Computing studies teachers in Seventh-day Adventist schools make some assumptions about knowledge, truth and beauty. All knowledge is seen to originate from God. He has created it for mankind to explore. Through technology we may examine some of this storehouse of order and knowledge in God's universe. Technology is as much part of God's creation as plants or humans. It does not replace God, but rather helps men find out more about Him.

God created man as an intelligent being with the capacity for logical thought and creativity. Computing technology provides scope for the growth of these capacities in the investigation of creation and the laws by which it is governed. One outgrowth of man's creativity is change, a process given by God, and brought about in part by processing knowledge.

Technology speeds the processing of knowledge, enabling man to find out more about the universe and its Creator. Information which is part of creation is better utilized through technology, and in particular through computing. Thus technology helps develop both knowledge and the world. Mankind has an obligation to use this knowledge in serving others responsibly.

Technology is a means for man to explore and appreciate the order and beauty of creation. There is in technology an inherent beauty which is part of the broader aesthetic quality of the universe.

RATIONALE

There are numerous reasons why students should develop computing skills. Some of these are set out in the rationale below.

Because technology is so pervasive in our world, computers are one means of helping Adventist students understand and use this technology. As computers are a device for processing information, their use can assist students effectively process the huge amount of information needed to cope effectively with the world. Their quality of lifestyle, number of career options, and even survival in a secular society can partly depend on computing skills which help them process and apply information. Also in a rapidly changing society, students need to use much information to live with change and use it to their advantage.

The ability to solve problems has always been vital to survival. Computing can be a tool to creatively help students develop this process in different ways. The logic and order required to solve problems is applicable to many life situations.

Computer skills are an outlet for student creativity, a quality which is closely allied to problem solving ability. Because students are created like their Creator, they have the desire and ability to display their creativity in diverse ways which can be multiplied through using computers. Such creativity as is developed through computing also enhances their opportunities to explore and understand other subjects.

Society is accustomed to a high standard of multi-media communication. It is important that Seventh-day Adventist students understand the nature of this communication as they attempt to relate the messages of the Bible to their world. Computer studies can help them creatively explore possibilities of multi-media presentations in communication.

Student productivity in many aspects of daily living can be improved through computing. As students learn to achieve more calculations, analysis and creation in less time through computer use, they can become more productive service-oriented church and society members.

VALUING OBJECTIVES

Valuing-Oriented Objectives of this Framework:

The valuing objectives listed below may be useful to include in your planning:

Students will:

1. Identify and discuss the ethical and legal issues relating to computer technology.
2. Make informed and responsible decisions about issues.
3. Appreciate that computer-based applications affect the lives of people in positive or negative ways.
4. Recognise the responsibilities of those who develop, control and use information technology.
5. Recognise the extent to which society depends on computers.

Other Valuing Objectives in State Syllabi:

In addition to the objectives of this framework, state syllabi include values-oriented objectives which should be referred to. An example is the following set from the NSW senior syllabus:

Students will develop:

1. The confidence to act ethically in decision-making.
2. An appreciation of the impact of computer technology on the individual, and on contemporary and future society.
3. An appreciation of the need to make informed and objective judgments about the appropriate use of computer-based solutions.
4. An appreciation of simplicity and elegance in computer-based solutions.

SECTION 2

PLANNING Ideas - The Sealed Section

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VALUES

A value is an estimate of worth or merit placed on some aspect of our experience. This section sets out a group of values which are important to computer studies. The list is a starting point to give teachers ideas.

Academic Values:

- Accuracy
- Discernment
- Discrimination
- Efficiency
- Logical thinking
- Order
- Organization

Aesthetic Values:

- Attractiveness
- Creativity
- Elegance
- Enjoyment
- Flexibility
- Originality

Ethical Values:

- Accountability
- Confidentiality
- Honesty
- Stewardship of resources

Personal Values:

- Ambition
- Excellence
- Initiative
- Patience
- Perseverance
- Punctuality
- Reliability
- Self-confidence
- Self-discipline
- Sense of personal value
- Thoroughness

Social Values:

- Co-operation
- Respect for property
- Responsibility
- Tolerance

ISSUES

Topics that highlight issues in computer studies lend themselves particularly well to the teaching of values. This list of issues on the following pages is a starting point for teachers.

Cashless Society:

- Monitoring of spending via transaction statements.
- Profiling tastes from transactions.
- Recording information about people.

Changing Nature of Work:

- Working at home
- Electronic mail and the internet
- New computing skills needed to survive
- The paperless office
- Quality of interaction with people decreased

Choices:

- Alternative software
- Computers, printers, memory size, screens, other peripherals
- Network or stand alone computers
- Systems development

Crime:

- Automatic-teller machine abuse
- Computer fraud
- Hacking
- Mobile phone and telecommunications crimes
- Piracy
- Viruses and trojan horse programs

Defence:

- Centralized control
- Dependence on computers
- Disasters by malfunction
- Security with computers
- Simulated wars

Employment:

- De-skilling
- Loss versus creation of jobs
- Multi-skilling
- Shift of labour market

Environment:

- Computer use in cars
- Disposal of used components
- Increased demand for electricity supply
- Paper and packing
- Recycling paper, toner cartridges and other consumables

Equity:

- Gender equity in the computer industry
- Increased accessibility for the disabled
- Programming ability according to gender
- Student access differences caused by socio-economic bias

Ergonomics:

- Design of furniture
- Electro magnetic radiation
- Office layout, lighting, facilities
- Repetitive strain injury

Health and Welfare:

- Change of lifestyle
- Medical advances
- What is the future impact on health and welfare systems?

Impact on Society:

- Changes in the banking industry
- Changing styles in creative arts: animation, visual arts, music, lighting, film
- Depersonalisation of society
- Mass media with technology
- Influence on materialism
- Relationship to perceived career opportunities
- Synthesized music — loss or gain?

Information Services:

- Control of the internet
- Possible disappearance of some printed media.
- Use of modems, electronic mail in changing communication patterns.

Leisure:

- Computers supposedly increase leisure time.
- Games:
 - Good or bad?
 - Pornography
 - Violence and sadism
 - Virtual reality
 - Waste of time and money

Privacy:

- Identifying personnel movements through credit card tracking
- Credit rating
- Direct selling mail lists
- Medical records
- Tax file numbers
- Use of technology to identify missing people

Use of Computers as a Power Tool:

- "Big Brother"
- Bulk mailing industry growth
- Cannot argue with computers
- Disasters due to blind trust
- Lack of personal touch in billing
- Receiving one cent or two cent bills
- Overreliance on computer technology
- Problems associated with computer failure

STRATEGIES FOR TEACHING VALUES

This section of the framework provides some suggestions for planning activities which help promote a more values-oriented approach to teaching computer studies. Many of the teaching strategies listed here could be used to teach a range of content.

Analogies:

We build analogies by showing similarities or correspondence between ideas, models or systems that are not normally associated with each other.

Example:

If we trace data history of how we record data on memory, we notice how we store more on less space. If we extend this infinitely, we start to think of God's ability.

Apply Values:

This tactic involves putting values into action. An example would be a class discussion to decide how to lay out the computer room for a more effective working atmosphere, or to find ways to restrict the playing of unproductive computer games.

Build Support for a Position:

For this tactic, we would show how to support a case either for or against a position. For example, we could ask students to support a case for or against closely monitoring peoples' movements or behaviour in a building. In such an instance, people may be watched, listened to, and put through so many checks that their freedom and even safety can be put at risk. At issue is peoples' personal privacy.

A variation of this tactic would be to debate the issue openly.

Case Studies:

Case studies examine values in operation. For example a study could ask students to find a story about a person who is disadvantaged because an incorrect credit rating is entered into a computer. Draw out the values involved in the case.

Classroom Climate:

Climate includes human relationships, physical setting and classroom organisation. We can teach values such as orderliness, organisation, attention to detail, and good preparation by insisting on them in day to day classroom organisation. We may:

- Have the room attractive and professional, with up-to-date equipment.
- Have attractive wall displays.
- Relate to students with understanding.
- Organize procedures competently.

Checklist:

A checklist is a list of values, or value statements. It can be used to identify and analyse an individual's or group's values position.

Example: Technological change

The example below indicates a number of contrasting attitudes towards technological change. The student will complete the frequency column while studying stimulus material such as videos or newspaper articles. A follow-up activity would be to analyse the frequency and distribution of ticks in order to recognise the value position of the stimulus material.

Technological Change

Attitudes to Technological Change	Frequency							
	1	2	3	4	5	6	7	8
It is essential to economic growth								
Improves living standards								
Creates unemployment								
Undermines traditional lifestyles								

Clarify Values:

Clarifying values pushes us beyond simply identifying values to: question the meaning of values, identify criteria for choices we make, clarify the meaning of values or the criteria used in our judgments of worth, think about the type of values involved in the situation — ethical, aesthetic, quality of work etc.

Example:

If a student says he/she must copy an inaffordable program, you ask questions such as:

- Would you steal from a computer shop?
- Why would you do this?
- When would you copy?
- What does copyright mean?

Dilemmas:

We create a dilemma when we provide students with a problem or situation which allows two courses of action, each of which has merits. Students must choose one option by prioritising values or consequences of their choice in some way.

Example:

Dilemma Question: Do we use computers in industry to reduce jobs?

- Look at the consequences of the two main alternatives.
- Look at the evidence for supporting each alternative.
- Evaluate the alternatives by reference to some principles.
- Make a decision.

Discussion:

We may discuss issues, values, situations, techniques etc. Examples of discussion topics are:

- Which is better, BASIC or Pascal?
- Why do we have these rules for the computer room?

Explanation:

We often have a duty to explain why we hold value positions, or why values are important to students. For example, we could explain why viruses are created, why the computer room must be tidy and secure, or the value of intellectual honesty in essay writing.

Hypotheticals:

A hypothetical is the posing of a lifelike situation which requires students to devise a satisfactory course of action to cope with the situation creatively. Hypotheticals can be posed as problems for students to solve.

Example:

You are working at a bank. Someone would like a list of customer accounts over \$50,000, and they offer you money for the list. Do you give them the names?

Identify Values:

We should take opportunities to identify values present in lesson content whenever possible, and not just ignore them. Sometimes these values are assumed or unstated.

Examples:

- In discussing the issue of piracy, identify the values involved.
- State that backing up files is not piracy, and ask what value it does demonstrate.
- Get students to read software licence agreements to state the values they endorse.

Ranking:

Ranking requires the listing of values statements that students are asked to place in order of importance or commitment, according to their own or an adopted values position.

Example:

List in order of priority the types of values involved in setting up a data base. Would the most important values be organisational values that create efficiency, communication values that promote accuracy, performance values that promote reliability, or ethical values that increase honesty etc?

Research Projects:

Research requires students to locate, organise and present information that focuses on a question, issue, problem etc. Research topics can easily involve a valuing component.

Example:

Choose an issue such as creating the cashless society or the changing nature of work and present a tutorial to the class outlining all sides of the issue.

Teacher Model:

A model is a standard or example to imitate. Teachers continually model values such as tolerance to others, competence, perseverance, patience, logical thinking etc. If teachers have authority, students are more inclined to imitate them.

Value Judgements:

The heart of the valuing process is making the actual value judgment. When making judgments we may evaluate the quality of decisions and choices made by others, criteria used in making choices — quality of reasons, quality of the authority we rely on etc, the type of standard, or we may rank a set of values in a priority order, or give sufficient reasons or weight of evidence for a judgment.

Example:

- Evaluate this software package. What are your criteria for making your judgement?
- Why is the package good or bad?
- Rank your evaluation criteria in order.

SECTION 3

The Planning Process

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DESIGNING YOUR PROGRAM – SOME BASICS

The Program

1. Read the local state syllabus to identify key computing terms in the course, and to find the scope and sequence of the key content you will need to teach.
2. Ask for help. You may ask other staff members for their input on the program, or you may ring the computing studies HOD of other neighbouring schools.
3. Consult books that help you find content and plan. You may ask book publishers to provide lists of texts and other books and sources of information. Books may show you a course structure, and how the syllabus works, particularly if they are written for the course. Compare your syllabus statement with the text book or books to see what is included and omitted in the texts. Try to buy every reasonable available text book as a resource.
4. Choose your main course topics according to the software and resources available to you.
5. Describe the content of these course topics in terms of its practical and theoretical components, and sequence these topics. Construct a scope and sequence chart on one page so you can see at a glance what the course contains.
6. Consider your students and match your topics and resources with their circumstances, interests and abilities.
7. Devise a summary of assessment for the course. This may include weightings for exam and assignment marks, types of tasks used etc.

Course Units

1. If you wish to plan a unit, start by gathering information about the unit topic.
 - Ask questions such as: What do I cover? List ideas or areas of study you want to teach in the unit. . Ask "what is the detail? Where does this fit?"
 - Think about what important values and issues could be included.

Example — Database Content:

- Decide whether a database is an appropriate way to organize data for a particular task.
 - Show how a card file can illustrate a database:
 - Backup files
 - Choose appropriate file names
 - Format a disk
 - Open, close, delete existing files
 - Organize folders or directories
 - Save and print files from within an application
 - Uses of databases (ie police, bank, medical) to raise the social issues mentioned in the issues section.
 - Values may include: accuracy, confidentiality, efficiency, and perseverance
 - Issues may include: accountability, computer crime, ergonomics, and privacy
2. List the most important outcomes you wish to pursue in the unit (ideas, skills, values, knowledge etc).

Example — Database Outcomes:

Create a database.

Describe the purpose of a database using examples.

Examine social issues arising from the topic.

Use the main features of a database effectively.

3. Plan and devise interesting teaching activities to assist learning.

Example — Database Activities:

Use a hypothetical. For example: You are working at a bank. Someone would like a list of customer accounts over \$50,000, and they offer you money for the list. Do you give them the names?

- Select content to include values. Choose the NIV Concordance as an example of a database. For example, set an assignment to search for occurrences of words or phrases such as "salvation".
 - Use an analogy to explain confidentiality. Just as you would want your written health details or school marks kept private, so computer records of such information must also be kept private.
 - Make value judgements about the programs used in this topic. Establish criteria for these judgements.
 - Use a case study of a person disadvantaged by an incorrect use of a database.
4. Look for resources to support the activities. These may include videos, text books, magazines, CD and internet references, government syllabus support materials, ideas and materials of other teachers.
 5. Fill in a planning grid, breaking the information into lessons. The following pages of this section of the framework show sample planning grids.
 6. Create teaching notes for your own use, or refine the teaching notes you have been making. Previous teaching notes may include assignments, tests, photocopied material, worksheets etc.
 7. Devise suitable assessment tasks for the unit.
 8. Throughout the whole process, remember the importance of teaching values and the valuing process. Also note that the planning steps overlap, and can happen in any order. There is likely to be a lot of movement to and fro between the steps.

TOPIC: Computer-based Systems

Context: 20%. In the Preliminary course, students were introduced to the basic concepts of computer-based systems. In this core topic, students look in detail at the processes and methodologies used in the analysis of existing, non-computer-based systems. In addition, they study the design of a computer-based system to replicate and improve on either an existing computer-based or non-computer-based system. Students will carry out a major investigation of an application of computer technology.

Assessment: Systems analysis major investigation.

Student Experiences: The major student experience in this topic should be a report that incorporates a feasibility study, an analysis, a design for a new system and the human impact of the resulting system. Students should study systems analysis and design in a context studied in the Computer-based Systems topic of the Preliminary course.

TOPIC: Computer-based Systems

CONTENT	OBJECTIVES	VALUES	ISSUES	RESOURCES
System development cycle	<ul style="list-style-type: none"> Describe the five stages of the system development cycle – requirements definition, feasibility study analysis, design, implementation and testing and operation and evaluation Describe the processes that occur within each stage of the cycle 	<ul style="list-style-type: none"> Order Organization Discrimination Logical thinking 	<ul style="list-style-type: none"> Alternative software Computers, printers, memory size, screens, other peripherals 	<ul style="list-style-type: none"> Computing Studies text (Chivers et al) Excursions to sites undergoing systems development
Feasibility study	<ul style="list-style-type: none"> Carry out a feasibility study that defines the nature of the problem, whether the problem is worth solving and in what direction the management should proceed 	<ul style="list-style-type: none"> Accountability Responsibility Tolerance 	<ul style="list-style-type: none"> Systems development Shift of labour market 	<ul style="list-style-type: none"> Guest systems analyst Choose a small business to analyse and research its operation

CONTENT	OBJECTIVES	VALUES	ISSUES	RESOURCES/ACTIVITIES
Systems analysis	<ul style="list-style-type: none"> Analyse an existing system (either computer-based or not) in terms of the activities, procedures and techniques used on the data Produce a report detailing the existing system and making recommendations as to the way it can be implemented by computer 		<ul style="list-style-type: none"> Office layout, lighting, facilities Working at home Electronic mail and the internet New skills needed to survive 	<ul style="list-style-type: none"> Write a report including four sections - feasibility study, analysis, system design and human impact
System design	<ul style="list-style-type: none"> Design a system that will solve the original problem, including recommendations as to the hardware and software required to implement the system 		<ul style="list-style-type: none"> The paperless office Quality of interaction Piracy 	<ul style="list-style-type: none"> Make value judgements in the design phase of system development
Social implications	<ul style="list-style-type: none"> Report on the human and societal results of the implementation of the system 		<ul style="list-style-type: none"> Viruses and trojan horse programs Increased demand for electricity supply Paper and packing Recycling paper, toner cartridges and other consumables 	

TOPIC: Issues Related to the Use of Computer Based Systems

Student Experiences: Students should be given the opportunity to study computer-based systems beyond those used in the school in order to extend their knowledge and understanding gained within the classroom to society at large. This may involve a case study approach, literature search and in-class discussion and debate.

Assessment: Research assignment

TOPIC: Issues Related to the Use of Computer Based Systems

CONTENT	OBJECTIVES	VALUES	ISSUES	RESOURCES/ACTIVITIES
<ul style="list-style-type: none"> • Changing nature of work • Privacy • Copyright • Control • Equity • Ethics • Computer crime • Environmental impact 	<ul style="list-style-type: none"> • Discuss each of the issues in the general context of a computerised society • Logically argue and substantiate a position on each of the issues 	<ul style="list-style-type: none"> • Discrimination • Logical thinking • Accountability • Responsibility • Tolerance 	<p>Examples of issues</p> <ul style="list-style-type: none"> • Working at home • Electronic mail and the internet • New skills needed to survive • The paperless office • Quality of interaction • Credit rating • Direct selling mail lists • Medical records • Tax file numbers • Piracy • Bulk mailing industry • Cannot argue with computers. • Disasters due to blind trust. • Lack of personal touch in billing 	<ul style="list-style-type: none"> • Computing Studies text (Chivers et al) • Research and talk presentation on privacy vs. Freedom of information • Debate the topic “Computer technology has adversely affected our environment.” • Case study of a particular computer crime • Discussion of how disasters follow from blind trust in computer technology

TOPIC: Databases

Context: Part of "Application Software Usage." (8% approx) Students will become competent users of databases.

Assessment: Practical assignments

Student Experiences: Practical use of databases

TOPIC: Databases

CONTENT	OBJECTIVES	VALUES	ISSUES	RESOURCES
<ul style="list-style-type: none"> • Run a database • Load a prepared document • make changes to the document • Create a new document • Save a document to secondary storage • Print a copy of a document • Display records • Sort records • Construct a query • Select records using a query • Create and print reports • Amend data in the database 	<ul style="list-style-type: none"> • Correctly use terminology related to databases • Run a database from the command-line or an iconic interface • Close a database • Load a document into a database • Make editing changes to an existing document • Create a new document in a database • Save document changes to disk from a database • Print a copy of a document from a database • Extract information from a prepared database through selective queries • Use a selective query to produce a printed report • Design a simple database to store personal name and address details • Modify the design of a database to account for changing storage needs 	<ul style="list-style-type: none"> • Accuracy • Efficiency • Order • Organization • Attractiveness • Creativity • Elegance • Ambition • Excellence • Initiative • Patience • Perseverance • Punctuality • Thoroughness 	<ul style="list-style-type: none"> • Monitoring of spending via transaction statements. • Profiling tastes from transactions. • Recording information about people. • New skills needed to survive • Alternative software • Changes in the banking industry • Direct selling mail lists • Tax file numbers • Big Brother • Bulk mailing industry • Receiving 1c or 2c bills 	<ul style="list-style-type: none"> • Computing Studies text (Chivers et al) • <u>ClarisWorks in the Classroom</u> • CDROM - ClarisWorks Trainer

SECTION 4

Appendices

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ASSESSMENT

Values of all kinds can be assessed in computer studies in different ways. For example, the aesthetic and academic values of this framework can be assessed by using many of the strategies for teaching values set out in the framework. To illustrate, students can be given marks for identifying values, for making judgements in reference to criteria, and for working through dilemmas or hypotheticals.

Ethical, social and performance values can be assessed more indirectly without reference to marks. Teachers can, for example, use attitude scales, questionnaires, self-assessment, peer assessment, essays and observation techniques for more informal assessment. These values could also receive a small allocation as part of a large assessment scheme. Teachers can also write descriptive statements about attitudes and build up profiles of students' attitudes.

Examples of tasks that assess values include the following:

Continuum Placement

Students can be asked to express their values by marking a continuum line from "strongly agree" to "strongly disagree", or "strongly believe" to "strongly disbelieve". This can be done before and after the teaching of a topic or issue to gain a measure of attitudinal change.

Assessing Breadth of Understanding of Issues

When assessing understanding of an issue, we can require students to show a breadth of perspective. For example, when discussing the changing nature of work, students can be expected to argue that computers have made the work environment better in various ways, and that they have also made it worse in other ways.

Assessing Support for Attitudes and Values

When making value judgements, students can be expected to cite evidences to support their opinions. Such evidence may include statistical information, expert opinion and illustrative case studies.

A range of strategies should be employed to ensure information is gathered regarding:

- ideas being formed and knowledge being gained
- skills being developed
- attitudes, values and feelings being demonstrated.

Strategies should be appropriate to the range of objectives and be supportive of the learning process.

Practical Assignments

Practical assignments are an important component of assessment of whether students have attained the necessary skill outcomes. They also provide the teacher with a means of assessing whether students possess the knowledge and understanding that underpin the skills, as well as some indication of the student's attitudes, values and feelings.

Practical Mastery Tests

Practical mastery tests differ from practical assignments in that they are conducted under supervision. They are particularly important in assessing whether students have attained the skill outcomes of the course.

Written Reports

Writing skills are an important indicator of the level of a student's mastery of the knowledge and understanding outcomes. Although a student's performance in report writing is heavily influenced by the student's literacy skills, these written communication skills are important. Knowledge and understanding are of little use if they cannot be communicated to others. Much of the material in computing studies depends on precise use of language to convey exact meanings and hence this form of assessment is appropriate.

Pen and Paper Tests

Well-constructed pen and paper tests can be an appropriate way of assessing some syllabus outcomes. They are not however appropriate for assessing all outcomes. They should be used in conjunction with a range of other assessment strategies.

Student Explanation and Demonstration

These provide opportunities for students to give an explanation or demonstration of a particular facet of computing to the teacher alone, to another student, to a group of students, or to the whole class.

Portfolios of Students' Work

Samples of work should be collected at regular intervals and dated, forming a cumulative file on the student. In some topics the material collected may build individual components into a complete assessable item, such as the documentation of a problem and its solution.

Structured Interviews

These can provide a teacher with specific information on how the student thinks in certain situations. The student's responses will often reveal strengths, weaknesses, misunderstandings, level of understanding, interest, attitudes and abilities.

Student-teacher Discussions

These differ from the structured interviews in that the student's talk is not limited nor directed by the teacher's questions, and may be initiated by the student.

Observation

While students are working individually or in groups, the teacher has the opportunity to observe and note aspects of student learning.

OBJECTIVES OF COMPUTING STUDIES

As a result of computer studies, students should be able to:

Applications:

- Use a range of computer systems competently.
- Use the main features of application packages effectively.
- Determine the suitability of application packages for a given task.
- Evaluate software packages.

Social Implications:

- Identify and discuss the ethical and legal issues relating to computer technology.
- Make informed and responsible decisions about issues.
- Appreciate that computer-based applications affect the lives of people in positive or negative ways.
- Recognise the responsibilities of those who develop, control and use information technology.
- Recognise the extent to which society depends on computers.

Programming:

- Appreciate that programming is a creative activity.
- Describe logical problem-solving steps using an appropriate algorithmic convention (ie flowcharts, pseudocode, structured English)
- Design, implement, test and document a solution to a problem, using the techniques of structured programming.
- Modify and extend existing programs.
- Be aware of the mathematics that supports computer operation.

Theory:

- Understand, define and use computer terminology.
- Recognize and explain the functions and relationships of the major components of a computer system.
- Describe the phases of the systems development cycle.
- Be familiar with a variety of operating systems eg MS-DOS, Mac Icon, UNIX, Apple Pro-DOS.
- Appreciate the history and development of computer devices.
- Appreciate the diversity of career opportunities in the computer field.

Use for Other Subject Areas:

- Recognise how and where computers may be used in other disciplines.
- Demonstrate how computers may be used as monitoring and control devices.
- Transfer computer skills and knowledge to other curricular and extra-curricular situations.
- Creatively explore the use of multi-media presentations in communication.

PROCESSES AND SKILLS

Below are listed eight processes and skill groups which are thought important to develop in computer studies. The list is not exhaustive or prescriptive. The intention is to check that the basics are touched on systematically in courses.

Communication:

- Dial up and log on
- Download and save data
- Search and retrieve data

Database:

- Design and print reports
- Edit
- Enter data
- Plan appropriate fields
- Select field attributes
- Sort, search, and select records

Desktop Publishing:

- Design layout
- Edit
- Enter data
- Format

File Management:

- Backup files
- Choose appropriate file names
- Format a disk
- Open, close, delete existing files
- Organize folders / directories
- Save and print files from within an application

Graphics:

- Manage files
- Modify images using editing functions
- Print
- Use drawing and painting tools

Programming:

- Design, implement, test, and document a program
- Modify and extend existing programs
- Use techniques of program design:
 - Flowchart
 - Pseudocode
 - Nassi-Schneiderman diagrams
 - Structured English

Spreadsheets:

- Compare alternative projections
- Display graphs
- Edit
- Enter data
- Enter formulas and functions
- Format
- Plan appropriate rows and columns

Word Processing:

- Create form letters
- Edit
- Enter data
- Format
- Use spell checker

Loss versus creation of jobs

- Impact of technology on the family
- Loss of income and self-esteem
- Family unit under stress
- Discussion, statistics in notes - discuss, video, research project, hypotheticals - 4 people around a table discussing father out of work
- Inability to make long-term commitment
- Empathy coming from confronting someone in the situation
- Value priorities in coping
- Reverse the situation to examine the positives. eg What if father gets a job selling computers? What is the impact of a huge salary hike on priorities?
- Discuss the possible good or evil seen in technology itself
- Ways to cope with change

Crime

Issues

- Mobile phones - tracing people, steal electronic signature
- Virus generations (and collections)
- Credit card fraud
- Hacking - unauthorised entry to a site
- Illegal use of automatic telling machines
- Rewriting a payroll to put fragments of money into an account

Ethical Issues

- What is crime?
- What is legal in one place is not in another (absolutes)
- Honesty
- Privacy
- Trust
- Fair reward for service

Activities

- Research clever crime (papers, internet, etc) being careful not to glorify it
- Explore the fun in discussing "dumb crime"
- Oral presentation
- Hypothetical - set up as director having to deal with a situation
- Guest speaker from gaol

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