Information Processes and Technology

Stage 6

Support Document

Preliminary Course
Programmed Units of Work

2008
Contents

Introduction................................................................................................................................. 4
Overview of Programmed Units of Work and Assessment Plan............................... 5
Preliminary Course Assessment Scheme ........................................................................... 6

Programmed Units of Work
Unit 1 Data, Information and Information Systems ....................................................... 7
Unit 2 The Impact of Information Systems........................................................................ 12
Unit 3 Numerical Information Systems ........................................................................... 21
Unit 4 Promoting a School Event....................................................................................... 30
Unit 5 Making a Movie........................................................................................................... 45
**Introduction**

This support document is designed to assist teachers as they plan for the implementation of the *Information Processes and Technology Stage 6 Syllabus*.

This support document provides programming and assessment ideas for the Preliminary Information Processes and Technology Course. The model provided takes an integrated approach to allow a major component of the course to be taught through the use of project work. Much of the content-based ‘learn abouts’ have been included as part of the ‘Understanding the Problem’ stage of system development. Students during this stage engage in a series of activities designed to enhance their theoretical knowledge and understanding, before applying this knowledge in later stages.

The use of project work as the main teaching and assessment tool provides a flexible approach which can be adapted by schools to suit existing resources. The model provided does not specify the resources required, as most schools will already have the resources they need.

Teachers should not view the program provided as a finished solution. Rather, it represents a framework that teachers can customise to suit their students. Teachers should provide more specific details about the tasks undertaken, and the resources used, by students.

Teachers should ensure that when exercises are set from existing texts the content is still relevant to the syllabus. Some texts contain details of concepts that are no longer covered by the syllabus while other texts define terms and concepts inappropriately.
Overview of Programmed Units of Work and Assessment Plan

<table>
<thead>
<tr>
<th>Preliminary Course</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Information Skills and Systems</td>
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<tr>
<td>Tools for Information Processes</td>
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<tr>
<td>Developing Information Systems</td>
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</tr>
<tr>
<td>Project work</td>
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<tr>
<td>Tests and exams</td>
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<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1</td>
<td>Topic 2</td>
<td>Topic 3</td>
</tr>
<tr>
<td>Data, Information and Information Systems</td>
<td>The Impact of Information Systems</td>
<td>Numerical Information Systems</td>
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<td>6 weeks</td>
<td>4 weeks</td>
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<tr>
<td>Group project</td>
<td>Individual project</td>
<td>Group project</td>
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</table>

Assessment plan

<table>
<thead>
<tr>
<th></th>
<th>Exam</th>
<th>Individual project</th>
<th>Group project</th>
<th>Individual project</th>
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<td>15%</td>
<td>30%</td>
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Overview

- In this model the content has been broken apart and reassembled into five different topics.
- Topic 1 uses a case study approach aimed at familiarising students with the components and characteristics of information systems. Students then analyse and document an information system. The seven information processes are identified and the nature of digital data and the relationship between data and information is examined.
- Topic 2 introduces students to the concept that information systems impact on people. Students research these impacts and present their findings as a PowerPoint presentation. This topic introduces students to the concept of team work (but not the stages in system development). It also introduces students to some of the ‘Tools for Information Processing’ for the first time.
- Topic 3 has its focus on numerical information processing and involves using a spreadsheet application to design a solution to a problem. The traditional stages in the development of information systems are introduced here. This topic also targets a number of the information processes.
- Topic 4 is a project-driven topic which focuses on the development of skills through the use of a wide variety of hardware and software tools.
- Topic 5 is an individual project where the focus is on working with multimedia applications to solve a problem.
# Preliminary Course Assessment Scheme

<table>
<thead>
<tr>
<th>Assessment components</th>
<th>Syllabus weightings</th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
<th>Task 5</th>
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<tr>
<td></td>
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<td>Half-yearly exam</td>
<td>Individual project</td>
<td>Group project</td>
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<td>Yearly exam</td>
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<td>Course outcomes</td>
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<td>P1.2, P2.1</td>
<td>P1.1, P1.2</td>
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<td>P1.1, P1.2</td>
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<td>P5.1, P6.1</td>
<td>P3.1, P5.1</td>
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<td>P2.1, P2.2</td>
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<td>P3.1, P5.1</td>
<td>P6.2, P7.1</td>
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<td>P6.1</td>
<td>P3.1, P4.1</td>
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<td>P7.1, P7.2</td>
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<td>P6.2</td>
<td>P5.1, P6.1</td>
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<tr>
<td>Due dates</td>
<td>T2 W1</td>
<td>T2 W5</td>
<td>T3 W2</td>
<td>T3 W7</td>
<td>T3 W9</td>
<td></td>
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<tr>
<td>Task components</td>
<td>• Multiple-choice questions</td>
<td>• Survey</td>
<td>• System documentation</td>
<td>• System documentation</td>
<td>• Multiple-choice questions</td>
<td>• Short-answer questions</td>
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<td>6</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Tools for information processes</td>
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<td>6</td>
<td>8</td>
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<td>6</td>
<td>15</td>
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<td>Developing information systems</td>
<td>30</td>
<td>3</td>
<td>5</td>
<td>12</td>
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<td>100</td>
<td>15</td>
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<td>30</td>
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</table>
## Unit 1

**Data, Information and Information Systems**

### Unit overview and rationale
This topic introduces students to the concept of an ‘information system’ and builds the framework for studying information systems. The historical development of information systems is looked at. The focus is on building the metalanguage used to describe information systems and recognising the components of an information system. Students identify a variety of information systems and use a case study approach to learn about information systems and document their components. Students are introduced to the seven information processes and the difference between data and information, and engage in a variety of exercises to build literacy with the metalanguage.

### Unit length: 6 weeks

### Syllabus topics covered

**Introduction to information skills and systems**
- Information systems in context
- Information processes
- The nature of data and information

**Tools for carrying out information processes**
Software tools, including:
- word processors
- communication software

### Targeted outcomes

- **P1.1** describes the nature of information processes and information technology
- **P1.2** classifies the functions and operations of information processes and information technology
- **P2.1** identifies and describes the information processes within an information system
- **P2.2** recognises and explains the interdependence between each of the information processes
- **P4.1** describes the historical development of information systems and relates these to current and emerging technologies
- **P5.1** selects and ethically uses computer based and non-computer based resources and tools to process information

### Assessment
Concepts covered in this topic are assessed through the use of examinations and project work later in the course. There is no assessment within the unit itself.

### Quality teaching focus
The main focus of this unit of work is to provide the constructs to build a deep knowledge and deep understanding of information systems. Metalanguage is the key to this. Students should engage in activities with a focus of building literacy and a conceptual understanding of the relationship between components in an information system. Students should be presented with a range of models describing information systems and given structured guidance in analysing these systems. A case study approach will provide relevance and reinforcement of concepts. The content should build on student’s background knowledge and link to other courses.
**Project activities/Integrated learning experiences**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Students</th>
</tr>
</thead>
</table>
| • introduces students to the concepts of information systems in context (ISC) through discussions and demonstrations using a variety of simple, familiar systems. | • work through a number of worksheet exercises to define
• a system – its environment and boundary
• information systems – participants and users, purpose, data and information, information processes and information technology |

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Students</th>
</tr>
</thead>
</table>
| • provides students with information about a mobile phone. Using a mobile phone as a case study, the teacher initiates a discussion leading students to identify each of the ISC components. | • analyse information provided to them about an MP3 player or digital camera. They then complete a worksheet guiding them to answer a series of questions that will help them construct an ISC diagram. For example:
What is the purpose of the system? |

<table>
<thead>
<tr>
<th>Information systems in context</th>
<th>Students learn to</th>
</tr>
</thead>
<tbody>
<tr>
<td>• diagrammatic representation of an information system in context.</td>
<td>• diagrammatically represent a given scenario that involves an information system</td>
</tr>
<tr>
<td>• the environment – everything that influences and is influenced by the information system.</td>
<td>• explain how an information system impacts on its environment and how it in turn impacts on the information system</td>
</tr>
<tr>
<td>• the purpose – a statement identifying who the information system is for and what it needs to achieve</td>
<td>• describe the environment and purpose of an information system for a given context</td>
</tr>
<tr>
<td>• who the information system is for includes individuals and organisations</td>
<td>• explain how a given need can be supported by an information system</td>
</tr>
<tr>
<td>• the information system – a set of information processes requiring participants, data/information and information technology built to satisfy a purpose</td>
<td>• describe an information system in terms of its purpose</td>
</tr>
</tbody>
</table>

**Registration**

- students learn to...
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the system boundary?</td>
<td>• information processes – computer based and non-computer based activities</td>
<td>• distinguish between, and categorise, the activities within an information system in terms of the seven information processes</td>
<td></td>
</tr>
<tr>
<td>What processing occurs?</td>
<td>• information technology – hardware and software used in information processes</td>
<td>• use an existing information system to meet a simple need</td>
<td></td>
</tr>
<tr>
<td>Who are the participants?</td>
<td>• data – the raw material used by information processes</td>
<td>• manually step through a given information system identifying the information process</td>
<td></td>
</tr>
<tr>
<td>What is the data?</td>
<td>• information – the output displayed by an information system</td>
<td>• describe, for a given information system, how the following relate to the information processes:</td>
<td></td>
</tr>
<tr>
<td>What is the information?</td>
<td>• user – a person who views or uses the information output from an information system</td>
<td>– participants</td>
<td></td>
</tr>
<tr>
<td>What is the information technology used?</td>
<td>• participant – a special class of user who carries out the information processes within an information system</td>
<td>– data/information</td>
<td></td>
</tr>
</tbody>
</table>

**Teacher**
- defines the seven information processes

**Students**
- identify the seven information processes involved in using a mobile phone as an example. Students are set a series of questions, such as:
  - What is collected by the system? How?
  - How is data organised?
  - How is data analysed?
  - How is data processed?
  - What data is stored and retrieved?
  - What data is transmitted and received?
  - How is the data transmitted and received?
  - What are the various ways information is displayed?
- Complete a worksheet prepared to reinforce understanding of the seven

**Information processes**
- collecting – the process by which data is entered into or captured by a computer system, including:
  - deciding what data is required
  - how it is sourced
  - how it is encoded for entry into the system
- organising – the process by which data is structured into a form appropriate for the use of other information processes such as the format in which data will be represented
- analysing – the process by which data is interpreted, transforming it into information
- storing and retrieving – the process by which data and information is saved and accessed later
- processing – a procedure that manipulates data and information
- transmitting and receiving – the process that sends and receives data and

**Registration**
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</tr>
</thead>
</table>
| information processes                            | information within and beyond information systems  
- displaying – the process that controls the format of information presented to the participant or user | distinguish between data and information in a given context  
- identify examples of information systems that use information from another information system as data  
- categorise data as image, audio, video, text and/or numbers  
- identify the data and the information into which it is transformed, for a given scenario |            |
| Teacher                                           | the nature of data and information  
- data – the input to an information system  
- data representation – the different types of media, namely:  
  - images  
  - audio  
  - video  
  - text  
  - numbers  
- information – the output which has been processed by an information system for human understanding  
- the generation of information from data via the information processes  
- how information from one information system can be data for another information system |            |            |
| Students                                          | organising  
- software for organisation  
  - word processors and desktop publishing for the arrangement of text, images and numbers for display  
- transmitting and receiving – the process that transfers information and data within and between information systems | manually step through a given information system identifying the information process  
- describe, for a given information system, how the following relate to the information processes:  
  - participants  
  - data/information  
  - information technology |            |
|                                                  | Research a software-based system such as an email system and analyse its components to produce an ISC diagram. (This is done to reinforce the concepts already looked at.)  
- outline all of the information processes involved with an email system and classify them under the seven information process headings |            |            |

Teacher

• provides students with a model illustrating the transformation from data into information (an IPO diagram could be used to illustrate this)

Student

• create simple spreadsheets, entering data and processing it to provide information by creating charts. For example:
  - comparing prices for an ISP
  - comparing costs per page of printers
• prepare a table defining and comparing the characteristics of different data types and providing examples
• use the mobile phone as a case study
  ∞ identify the range of data types
  ∞ describe how data is processed to create information

Students

• research a software-based system such as an email system and analyse its components to produce an ISC diagram. (This is done to reinforce the concepts already looked at.)
• outline all of the information processes involved with an email system and classify them under the seven information process headings
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• software for transmitting and receiving</td>
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<tr>
<td>– communications packages</td>
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<tr>
<td>– transmitting and receiving text, numeric, image, audio and video</td>
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<tr>
<td>Students</td>
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<tr>
<td>• compare and contrast different communication systems such as email, Skype and MSN, and summarise their findings in a series of ISC diagrams. (This activity could be set as a homework exercise if these systems are not available within the school. The exercise should reinforce the concepts covered in this unit.)</td>
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<tr>
<td>Students</td>
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<td></td>
<td></td>
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<tr>
<td>• software for organisation</td>
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<td></td>
<td></td>
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<tr>
<td>– word processors and desktop publishing for the arrangement of text, images and numbers for display</td>
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<tr>
<td>transmitting and receiving</td>
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<tr>
<td>• transmitting and receiving – the process that transfers information and data within and between information systems</td>
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<tr>
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<tr>
<td>– text, numeric, image, audio and video</td>
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</table>
## Unit 2
### The Impact of Information Systems

**Unit overview and rationale**
This unit introduces students to the concept that information systems impact on people. Students research these impacts and present their findings as a structured PowerPoint presentation with accompanying lecture notes. This topic introduces students to the concept of team work, but not the stages in system development. It allows students to build their research and communication skills. It also introduces students to some of the 'Tools for Information Processing' for the first time. Students develop skills in working cooperatively to achieve a result. Schedules and deadlines are set by the teacher.

**Unit length:** 6 weeks

### Syllabus topics covered
**Social and ethical issues**
Affecting individuals, organisations and those in the environment
- privacy of the individual
- security of data and information
- accuracy of data and information
- data quality
- changing nature of work
- appropriate information use
- health and safety
- copyright laws

Responsibility of developers
- the impact of systems on participants and users
- the difference between human-centred and machine-centred systems

**Global issues**

**Tools for carrying out information processes**
- Hardware devices, including LCD displays, printers, flash memory, network storage, digital projectors
- Software tools, including word processors, presentation software, communication software
- Non-computer procedures

**The roles of people developing systems and system complexity**
- Roles played by team members
- Strengths and weaknesses of team members

### Targeted outcomes
- **P3.1** identifies and describes social and ethical issues
- **P5.1** selects and ethically uses computer based and non-computer based resources and tools to process information
- **P7.1** recognises, applies and explains management and communication techniques used in individual and team-based project work
- **P7.2** uses and justifies technology to support individuals and teams

### Assessment
There will be no formal assessment within this topic. Concepts covered in this topic are assessed through the use of examinations and project work later in the course.

### Quality teaching focus
This unit follows a productive pedagogy, with the main focus being on substantive communication. Students working as a team will need to communicate effectively to manage their project, as well as present neatly packaged information about the social and ethical issues associated with using information systems. The group project should engage students in their own learning.
### Project description

Students working in small teams analyse an existing IS such as YouTube, RTA Data Management System, MySpace and Facebook. Each team will only focus on one IS. The team needs to identify and discuss the social and ethical issues involved with the IS and the way these issues affect individuals, organisations, and those in the environment. Each team will need to:

- identify and discuss social and ethical issues affecting individuals, organisations and those in the environment
- discuss to what extent the owners of the IS have attempted to overcome each issue

Each team is required to produce a PowerPoint presentation, an associated set of lecture notes and a one-page summary that will be distributed to the rest of the class. Each team will deliver their presentation to the class.

### Teacher

- provides each team with a detailed set of criteria that need to be addressed for their chosen topic
- explains the project to students and provides the students with an assessment rubric for the project

### Teacher

- introduces the concept of teamwork and the roles played by different individuals
- recognises different roles of people and how they communicate throughout different stages of the project

### roles of people involved in systems development

- different roles played by individuals in the team and communication between team members

<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project description</td>
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<td></td>
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</tr>
<tr>
<td>Students working in small teams analyse an existing IS such as YouTube, RTA Data Management System, MySpace and Facebook. Each team will only focus on one IS. The team needs to identify and discuss the social and ethical issues involved with the IS and the way these issues affect individuals, organisations, and those in the environment. Each team will need to:</td>
<td></td>
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<tr>
<td>• identify and discuss social and ethical issues affecting individuals, organisations and those in the environment</td>
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<tr>
<td>• discuss to what extent the owners of the IS have attempted to overcome each issue</td>
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</tr>
<tr>
<td>Each team is required to produce a PowerPoint presentation, an associated set of lecture notes and a one-page summary that will be distributed to the rest of the class. Each team will deliver their presentation to the class</td>
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<tr>
<td>Teacher</td>
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</tr>
<tr>
<td>• provides each team with a detailed set of criteria that need to be addressed for their chosen topic</td>
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<tr>
<td>• explains the project to students and provides the students with an assessment rubric for the project</td>
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<tr>
<td>Teacher</td>
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</tr>
<tr>
<td>• introduces the concept of teamwork and the roles played by different individuals</td>
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<tr>
<td>roles of people involved in systems development</td>
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<tr>
<td>• different roles played by individuals in the team and communication between team members</td>
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<td>• recognises different roles of people and how they communicate throughout different stages of the project</td>
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<tr>
<td>Project activities/Integrated learning experiences</td>
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<td>Students learn to</td>
<td>Registration</td>
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<tr>
<td>Students (project work)</td>
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</tr>
<tr>
<td>• identify and document the skills of each team member</td>
<td>strengths and weaknesses of individual team members</td>
<td>• describe social and ethical issues that relate to:</td>
<td></td>
</tr>
<tr>
<td>• negotiate the roles of each team member and decide on how to divide up the project tasks</td>
<td>• communication</td>
<td>– information systems users</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• interpersonal</td>
<td>– participants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• technical</td>
<td>• ensure that relevant social and ethical issues are addressed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• organisational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>social and ethical issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• provides students with a selection of newspaper reports that discuss social and ethical issues affecting individuals, organisations and those in the environment. The reports should cover each of the following issues:</td>
<td>• social and ethical issues arising from the processing of information, including:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– privacy of the individual</td>
<td>• privacy of the individual</td>
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<tr>
<td></td>
<td>– security of data and information</td>
<td>– security of data and information</td>
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<tr>
<td></td>
<td>– accuracy of data and information</td>
<td>– accuracy of data and information</td>
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<tr>
<td></td>
<td>– data quality</td>
<td>– data quality</td>
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<tr>
<td></td>
<td>– changing nature of work</td>
<td>– changing nature of work</td>
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<td></td>
<td>– appropriate information use</td>
<td>– appropriate information use</td>
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<td></td>
<td>– health and safety</td>
<td>– health and safety</td>
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<tr>
<td></td>
<td>– copyright laws</td>
<td>– copyright laws</td>
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</tr>
<tr>
<td>Students</td>
<td>the people affected by social and ethical issues, including:</td>
<td>• ensure that relevant social and ethical issues are addressed</td>
<td></td>
</tr>
<tr>
<td>• engage in discussions focusing on the issues highlighted in the newspaper articles</td>
<td>– participants within the information system</td>
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<td></td>
<td>– users of the information system</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>– those in the environment</td>
<td></td>
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<tr>
<td>Teacher</td>
<td>current government legislation to protect the individual and organisations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• provides students with summary of legislation designed to protect individuals and organisations</td>
<td>the use of information systems in fields such as manufacturing as well as the traditional fields of observation and recording</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td>discuss the impact of legislation in overcoming social and ethical issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• discuss the impact of legislation in overcoming social and ethical issues</td>
<td>complete a worksheet or activity to help cement new ideas and the metalanguage used in these discussions</td>
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<tr>
<td>Project activities/Integrated learning experiences</td>
<td>Students learn about</td>
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<tr>
<td><strong>Teacher</strong></td>
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</tr>
<tr>
<td>• makes students aware of the social and ethical responsibilities of developers</td>
<td>• the ethical and social responsibility of developers</td>
<td>• implement systems that pay as much attention to the needs of participants as they do to information technology</td>
<td></td>
</tr>
<tr>
<td>• provides students with examples of poorly designed IS so that their deficiencies can be appreciated</td>
<td>• machine-centred systems simplify what computers do at the expense of participants</td>
<td>• identify and explain reasons for the expansion of information systems, including:</td>
<td></td>
</tr>
<tr>
<td>• makes the distinction between machine-centred and human-centred systems</td>
<td>• human-centred systems as those that make participants’ work as effective and satisfying as possible</td>
<td>– advances in technology</td>
<td></td>
</tr>
<tr>
<td>• provides students with information on OHS and ergonomics as they relate to the use of information technology</td>
<td>• how the relationships between participants change as a result of the new system</td>
<td>– suitability of information technology for repetitive tasks</td>
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<tr>
<td><strong>Students</strong></td>
<td></td>
<td></td>
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<tr>
<td>• analyse a poorly designed or constructed IS and highlight the issues, looking specifically at OHS and ergonomics</td>
<td>• ensuring the new system provides participants with a safe work environment</td>
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</tr>
<tr>
<td>• complete worksheets designed to reinforce concepts and the metalanguage used</td>
<td>• awareness of the impact the system may have on the participants, including:</td>
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</tr>
<tr>
<td>• the ethical and social responsibility of developers</td>
<td>– opportunities to use their skills</td>
<td>– access to information – legislation in some countries prevents access to information</td>
<td></td>
</tr>
<tr>
<td>• machine-centred systems simplify what computers do at the expense of participants</td>
<td>– meaningful work</td>
<td>– different copyright, privacy laws</td>
<td></td>
</tr>
<tr>
<td>• human-centred systems as those that make participants’ work as effective and satisfying as possible</td>
<td>– need for change</td>
<td>– decisions about which legal system the IS will operate under</td>
<td></td>
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<tr>
<td>• how the relationships between participants change as a result of the new system</td>
<td>– opportunities for involvement and commitment</td>
<td>– different communication standards between countries</td>
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<tr>
<td><strong>Teacher</strong></td>
<td></td>
<td></td>
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<tr>
<td>• conducts discussions about how global information systems impact on individuals, organisations and those in the environment, providing some real-life examples relating to:</td>
<td>• global information systems:</td>
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<tr>
<td>• access to information – legislation in some countries prevents access to information</td>
<td>– where the purpose involves international organisations, or</td>
<td></td>
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<tr>
<td>• different copyright, privacy laws</td>
<td>– where the data and processes are distributed across national boundaries</td>
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</tr>
<tr>
<td>• decisions about which legal system the IS will operate under</td>
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<tr>
<td>• different communication standards between countries</td>
<td></td>
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<tr>
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<td>Students learn about</td>
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<tr>
<td>• research real-life examples of global social and ethical issues by finding relevant newspaper articles, for example using SMH online database</td>
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<tr>
<td><strong>Students (project work)</strong></td>
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<tr>
<td>• analyse the requirements of their project in light of the classroom discussions to identify the social and ethical issues they need to focus on</td>
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<tr>
<td><strong>Teacher</strong></td>
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<tr>
<td>• provides students with school-based examples of the social and ethical issues associated with each of the information processes before students begin to research their topics. In this way, students should build up an understanding of what they should focus on in their projects</td>
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<tr>
<td><strong>Students</strong></td>
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<tr>
<td>• complete exercises to appreciate how social and ethical issues could impact on the information processes involved with systems like ‘student reporting’ or ‘student attendance’</td>
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<tr>
<td><strong>Students (project work)</strong></td>
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<tr>
<td>• research their topic</td>
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<tr>
<td>• identify what social and ethical issues their team needs to be mindful of when collecting, organising and displaying information as part of their presentation</td>
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<tr>
<td><strong>social and ethical issues associated with:</strong></td>
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<tr>
<td><strong>collecting</strong></td>
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<td></td>
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<tr>
<td>• social and ethical issues in collecting</td>
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<tr>
<td>− bias in the choice of what and where to collect data</td>
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<tr>
<td>− accuracy of the collected data</td>
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<tr>
<td>− copyright and acknowledgment of source data when collecting</td>
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<tr>
<td>− the rights to privacy of individuals on whom data is collected</td>
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<tr>
<td>− ergonomic issues for participants entering large volumes of data into an information system</td>
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<tr>
<td><strong>organising</strong></td>
<td></td>
<td></td>
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<tr>
<td>• social and ethical issues associated with organising, including:</td>
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<tr>
<td>− current trends in organising data, such as:</td>
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<tr>
<td>o the increase in hypermedia as a result of the World Wide Web</td>
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<tr>
<td>o the ability of software to access</td>
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<tr>
<td>• make predictions about new and emerging trends in data collection based on past practices</td>
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<tr>
<td>• recognise personal bias and explain its impact on data collection</td>
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<td>• identify the privacy implications of particular situations and propose strategies to ensure they are respected</td>
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<td>• predict errors that might flow from data inaccurately collected</td>
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<tr>
<td>• predict issues when collecting data that might arise when it is subsequently analysed and processed</td>
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<tr>
<td>• assess future implications when making decisions about the way data is organised</td>
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<td>Project activities/Integrated learning experiences</td>
<td>Students learn about</td>
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<td></td>
<td>different types of data</td>
<td>• analyse data on individuals for the purpose it was collected</td>
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<tr>
<td></td>
<td>o a greater variety of ways to organise resulting from advances in display technology</td>
<td>• retrieve and use data in an ethical way</td>
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<tr>
<td></td>
<td>- the cost of poorly organised data, such as redundant data in a database used for mail-outs</td>
<td>• identify examples of potential human bias in data processing</td>
<td></td>
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<tr>
<td>analysing</td>
<td>• social and ethical issues associated with analysis, including:</td>
<td>• describe and employ net-etiquette when using the Internet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unauthorised analysis of data</td>
<td>• predict and discuss possible future trends in communications and the impact they are likely to have on the transmitting and receiving of data/information</td>
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<td></td>
<td>- data incorrectly analysed</td>
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<td></td>
<td>- erosion of privacy from linking databases for analysis</td>
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<td>storing and retrieving</td>
<td>• social and ethical issues, including:</td>
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<td></td>
<td>- the security of stored data</td>
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<tr>
<td></td>
<td>- unauthorised retrieval of data</td>
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<td></td>
<td>- advances in storage and retrieval technologies and new uses such as data matching</td>
<td></td>
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<tr>
<td>processing</td>
<td>• social and ethical issues associated with processing</td>
<td></td>
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<td></td>
<td>- ownership of processed data</td>
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<td></td>
<td>- bias in the way participants in the system process data</td>
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<tr>
<td>transmitting and receiving</td>
<td>• social and ethical issues associated with transmitting and receiving</td>
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<td></td>
<td>- accuracy of data received from the Internet</td>
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<td>Project activities/Integrated learning experiences</td>
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</tbody>
</table>
| Way text | - security of data being transferred  
- net-etiquette  
- acknowledgment of data source  
- global network issues, time zones, date fields, exchange rates  
- changing nature of work for participants, such as work from home and telecommuting  
- current developments and future trends in digital communications, radio and television  
- the impact of the Internet on traditional business | | |
| displaying | • social and ethical issues associated with displaying  
- communication skills of those presenting displays  
- past, present and emerging trends in displays  
- appropriate displays for a wide range of audiences, including:  
  o standards for display for the visually impaired  
  o displays suitable for young children | | |
| Teacher | • provides students with information on ‘collecting’ | | |
| Students (project work) | • collect information for their notes and presentation. (Information should be collected from web-based and paper-based sources.) | | |
| collecting | • collecting – the process by which data is captured or entered into a computer system, including:  
  - deciding what data is required  
  - how it is sourced  
  - how it is encoded for entry into the system  
  - software used for collection | • use the Internet to locate data for a given scenario | |
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
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<tbody>
<tr>
<td>Teacher</td>
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<tr>
<td>• leads students in a discussion of how information should be organised in a paper-based document as compared to a PowerPoint presentation</td>
<td>software that allows participants to enter or import data</td>
<td>choose the most appropriate format for a given set of data and identify and describe the most appropriate software and method to organise it</td>
<td></td>
</tr>
<tr>
<td>• helps students arrive at a set of guidelines for organising documents and presentations</td>
<td>software that allows participants to move data between applications</td>
<td>compare and contrast different methods of organising the same set of data using existing software applications</td>
<td></td>
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<tr>
<td>Students (project work)</td>
<td>• non-computer procedures in collecting</td>
<td>• use software to combine data organised in different formats</td>
<td></td>
</tr>
<tr>
<td>• plan the structure of their PowerPoint presentation</td>
<td>- literature searches</td>
<td></td>
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<tr>
<td>• create their paper-based document and their presentation, focusing on the software features available for organising their information</td>
<td>- surveys and interviews</td>
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<tr>
<td>• identify and describe the hardware and software needed to complete their project</td>
<td>- form design for data collection</td>
<td></td>
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<tr>
<td>• set up and operate hardware needed for displaying</td>
<td>- manual recording of events</td>
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<tr>
<td>storing and retrieving</td>
<td>• hardware for storing and retrieving</td>
<td>• choose and justify the most appropriate format</td>
<td></td>
</tr>
<tr>
<td>• hardware secondary storage devices, including: network storages</td>
<td>• non-computer tools for organising</td>
<td></td>
<td></td>
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<tr>
<td>• flash memory</td>
<td>- pen and paper methods for organising data</td>
<td></td>
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</tr>
<tr>
<td>organising</td>
<td>• organising – the process by which data is structured into a form appropriate for use by other information processes</td>
<td></td>
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<tr>
<td>• software for organisation</td>
<td>• software for organisation</td>
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</tr>
<tr>
<td>• word processors and desktop publishing for the arrangement of text, images and numbers for display</td>
<td>- presentation software allowing data to be arranged on slides, providing control over the sequence in which information is displayed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• presentation software allowing data to be arranged on slides, providing control over the sequence in which information is displayed</td>
<td>• non-computer tools for organising</td>
<td></td>
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</tr>
<tr>
<td>• non-computer tools for organising</td>
<td>- pen and paper methods for organising data</td>
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</tbody>
</table>

Software that allows participants to enter or import data:

- software for organisation
  - word processors and desktop publishing for the arrangement of text, images and numbers for display
  - presentation software allowing data to be arranged on slides, providing control over the sequence in which information is displayed
- non-computer procedures in collecting
  - literature searches
  - surveys and interviews
  - form design for data collection
  - manual recording of events
  - existing non-computer data
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
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</thead>
<tbody>
<tr>
<td>their presentation</td>
<td>displaying – the method by which information is output from the system to meet a purpose</td>
<td>method for displaying information given a particular set of circumstances</td>
<td></td>
</tr>
<tr>
<td>• practise presenting their presentation</td>
<td>• hardware for displaying, including:</td>
<td>• describe the operation of display hardware</td>
<td></td>
</tr>
<tr>
<td>• print out the notes for the presentation</td>
<td>– screens (LCD, CRT and plasma screens) for displaying text, numbers, images and video</td>
<td>• use a range of hardware and software combinations to display different types of information</td>
<td></td>
</tr>
<tr>
<td>• present their presentations and notes to the rest of the class</td>
<td>– printers and plotters for displaying text, numbers and images</td>
<td>• format a text document with appropriate use of fonts, spacing and layout for printed and screen displays</td>
<td></td>
</tr>
<tr>
<td>• evaluate other team presentations using criteria provided by the teacher</td>
<td>– digital projectors and interactive whiteboards for displaying text, numbers, images and video</td>
<td>• create audio, image and video displays with presentation software</td>
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</tr>
<tr>
<td></td>
<td>• software for display</td>
<td>• compare and contrast displays created without a computer to those created with a computer</td>
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<tr>
<td></td>
<td>– interfaces for hardware display devices</td>
<td>• identify, discuss and appreciate the widespread use of non-computer methods of displaying information</td>
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<tr>
<td></td>
<td>– display features in applications packages, including:</td>
<td>• design a display for a wide variety of users</td>
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<tr>
<td></td>
<td>o formatting</td>
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<td>o spacing</td>
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<td>o tables</td>
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<td></td>
<td>o charts</td>
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## Unit 3
### Numerical Information Systems

**Unit overview and rationale**
Students build their own numerical information system. This involves a problem-solving approach. Data is collected, organised, processed, analysed and displayed using a spreadsheet application. The traditional stages in the development of an information system are introduced here. The quality of the information system will be judged on its ability to present information based on the analysis of data in the system.

**Unit length:** 4 weeks

<table>
<thead>
<tr>
<th>Syllabus topics covered</th>
<th>Targeted outcomes (outcomes in bold font to be assessed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information processes</strong></td>
<td>P1.1 describes the nature of information processes and information technology</td>
</tr>
<tr>
<td>• Collecting</td>
<td>P1.2 classifies the functions and operations of information processes and information technology</td>
</tr>
<tr>
<td>• Organising</td>
<td>P2.1 identifies and describes the information processes within an information system</td>
</tr>
<tr>
<td>• Analysing</td>
<td>P2.2 recognises and explains the interdependence between each of the information processes</td>
</tr>
<tr>
<td>• Processing</td>
<td>P3.1 identifies and describes social and ethical issues</td>
</tr>
<tr>
<td>• Storing and retrieving</td>
<td>P5.1 selects and ethically uses computer based and non-computer based resources and tools to process information</td>
</tr>
<tr>
<td>• Displaying</td>
<td>P6.1 analyses and describes an identified need</td>
</tr>
<tr>
<td><strong>Social and ethical issues</strong></td>
<td>P6.2 generates ideas, considers alternatives and develops solutions for a defined need</td>
</tr>
<tr>
<td>• Bias and accuracy of data collected</td>
<td>P7.1 recognises, applies and explains management and communication techniques used in individual and team-based project work</td>
</tr>
<tr>
<td><strong>Traditional stages in developing a system</strong></td>
<td>P7.2 uses and justifies technology to support individuals and teams</td>
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<tr>
<td>• Understanding the problem</td>
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<td>• Planning</td>
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<td>• Designing</td>
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<tr>
<td>• Implementing</td>
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<tr>
<td>• Testing, evaluation and maintaining</td>
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<tr>
<td><strong>The roles of people developing systems and system complexity</strong></td>
<td></td>
</tr>
<tr>
<td>• Systems for individuals and/or organisation</td>
<td></td>
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<tr>
<td>• Systems developed by individuals and/or teams</td>
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<tr>
<td><strong>System documentation</strong></td>
<td></td>
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<tr>
<td>• Use surveys and interviews to collect system information</td>
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</table>

**Assessment**
The unit will be assessed directly through the use of project work. The project will make up 15% of the overall assessment.

**Quality teaching focus**
This unit follows a productive pedagogy. Higher-order thinking is required to solve the problem set. Students will be provided with a clear strategy for solving the problem following the ‘Traditional stages in systems development’. Engagement and student self-regulation will be the key to successfully completing the unit. The problem should be something students can connect with.
### Project activities/Integrated learning experiences

**Teacher**
- outlines the Traditional Stage in Developing an Information System (IS).
- presents students with the Waterfall model showing the relationship between the stages and time

**Students**
- given information about a number of different systems and asked to work out what would be necessary to develop each of the systems. Some case study scenarios could include:
  - a home load calculator
  - household budget planner
  - share tracking system
  - attendance system
  - library loans system
- examine and report on the complexity of systems development using these case studies

**Project description**
Students are provided with a complex set of specifications requiring them to develop a numerical information system using a spreadsheet. As part of the specifications, students will need to develop quite a

### Students learn about

#### traditional stages in developing a system
- understanding the problem
- planning
- designing
- implementing
- testing, evaluating and maintaining

#### complexity of systems
- systems for individuals
- systems for organisations
- systems developed by individuals

#### roles of people involved in systems development

### Students learn to

- recognise and apply appropriate stages in their project work
- read and interpret the requirements for a new system in terms of:
  - the needs of the users of the information system
  - who the participants are
  - the data/information to be used
  - required information technology
  - information processes

- read a set of specifications
- understand the need for a time schedule
- test and evaluate an existing system to see if it meets requirements and specifications
- analyse and customise user interfaces and other tasks in applications software forming part of the solution

### Registration
- read a set of specifications
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
</table>
| comprehensive survey to collect significant amounts of data from a variety of different groups and create a well-designed multi-sheet spreadsheet which makes use of complex features such as charting, trend analysis and pivot tables. Some of the more capable students may investigate automated procedures using macros. For example, students could examine questions such as:  
• Is the current school uniform appropriate?  
• What music genres are most popular with students?  
• What types of technologies do students use?  
• What jobs interest students the most?  
Students are presented with a Gantt chart describing the development stages and tasks they need to undertake in each stage (this helps students to scaffold their project) |                      |                  |             |
| Teacher |                      |                  |             |
| • explains the project to the students and provides students with an assessment rubric for the project |                  |                  |             |
| Understanding the problem | social and ethical issues |                  |             |
| Teacher |                      |                  |             |
| • provides direct assistance to students throughout the project, interrupting where necessary to provide for discussions and explanations of key issues and content | • social and ethical issues in collecting  
– bias in the choice of what and where to collect data  
– accuracy of the collected data  
– the rights to privacy of individuals on whom data is collected  
• social and ethical issues arising from the processing of information, including:  
– accuracy of data and information  
– data quality  
• social and ethical issues associated with |                  | • describe social and ethical issues that relate to:  
– information system users  
– participants  
• ensure that relevant social and ethical issues are addressed |             |
| Students (project work) |                      |                  |             |
| • analyse and interpret the scenario requirements for a new system  
• predict the sorts of social and ethical issues that may arise |                  |                  |             |
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• assess the hardware and software requirements needed to meet their system's needs from the point of view of the targeted information processes</td>
<td>analysis, including:</td>
<td>• identify examples of potential human bias in data processing</td>
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<td></td>
<td></td>
<td>• data incorrectly analysed</td>
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<td></td>
<td></td>
<td>• social and ethical issues associated with processing</td>
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<td></td>
<td></td>
<td>• bias in the way participants in the system process data</td>
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<tr>
<td><strong>Teacher</strong></td>
<td><strong>collecting</strong></td>
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<tr>
<td>• presents students with a selection of survey forms and discusses the merits of the different data collection strategies used on the forms, eg check boxes, agree/disagree-type rating scales and free-form answers</td>
<td>collecting – the process by which data is captured or entered into a computer system, including:</td>
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<td></td>
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<td>• deciding what data is required</td>
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<td></td>
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<td>• how it is sourced</td>
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<td>• how it is encoded for entry into the system</td>
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<td></td>
<td>• hardware used for collection</td>
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<td></td>
<td></td>
<td>• keyboards and/or optical character readers to collect numbers and text</td>
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<td></td>
<td></td>
<td>• data capture devices such as counters for counting cars on a road</td>
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<td></td>
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<td>• software used for collection</td>
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<td>• device drivers that allow hardware to interface with the operating system</td>
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<td></td>
<td></td>
<td>• software that allows participants to enter or import data</td>
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<td>• software that allows participants to move data between applications</td>
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<td>• non-computer procedures in collecting</td>
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<td></td>
<td></td>
<td>• surveys and interviews</td>
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<td></td>
<td></td>
<td>• form design for data collection</td>
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<tr>
<td><strong>Students</strong></td>
<td><strong>organising</strong></td>
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<tr>
<td>• determine areas of bias in using different collection tools</td>
<td>organising – the process by which data is structured into a form appropriate for use by other information processes</td>
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<td></td>
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<td>• how different methods of organising affect</td>
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<td>• determine the advantages and disadvantages of ‘pen and paper’ and online collection of survey data</td>
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<tr>
<td>Teacher</td>
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<tr>
<td>• provides students with information and a worksheet on the difference between text and numeric data when it comes to sorting</td>
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<td>• initiates class discussions on the different ways survey data can be entered into a</td>
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</table>
**Project activities/Integrated learning experiences**

- system, specifically OCR, handwriting recognition and machine reading of data like multiple-choice answer sheets

**Students (project work)**

- examine a variety of spreadsheet templates that illustrate the need for an appropriate organisational structure and discuss the structures
- evaluate different ways to organise their survey sheet in a word processor

**Students**

- examine a variety of charts to evaluate different ways in which information can be presented. (Students need to know when to use a pie chart, a bar chart, a line graph.)

**Students learn about**

- processing, for example:
  - letters of the alphabet represented as images rather than text
  - numbers represented as text rather than numeric
- the way in which the hardware used for collection organises data by digitising images, audio, video, numeric and text
- software for organisation
  - word processors and desktop publishing for the arrangement of text, images and numbers for display
  - spreadsheets for the arrangement of numerical data for processing

**Analysing**

- analysing – the process by which data can be represented and summarised so that humans can better understand it
- non-computer tools, for analysing, including:
  - non-computer models and simulations
- hardware requirements for analysing, including:
  - large amounts of primary and secondary storage allowing for fast processing
  - fast processors allowing many rapid calculations
- software features for analysis, including:
  - searching/selecting data
  - sorting
  - modelling/simulations
  - what-if scenarios
  - charts and graphs to identify trends

**Students learn to**

- describe the best organisation for data for a particular type of analysis
- identify hardware requirements to carry out a particular type of analysis
- compare and contrast computer and non-computer tools for analysis on the basis of speed, volume of data that can be analysed, and cost

**Registration**

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<table>
<thead>
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<th>Students learn to</th>
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<tbody>
<tr>
<td>Teacher</td>
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<tr>
<td>• leads a discussion on the role of the CPU and other hardware requirements to process, store and display numerical data</td>
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<tr>
<td>• provides students with simple exercises requiring them to format text and numerical data in a spreadsheet</td>
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</table>

**processing**
- processing – a method by which data can be manipulated in different ways to produce a new value or result (eg, calculating a total, filtering an email, changing the contrast of an image, changing the volume of a wave file)
- hardware in processing
  - hardware with fast processors, a lot of RAM and large storage capacity for image, video and audio processing
  - increased processing speed, by:
    - increased clock speeds
    - increased bus capacity
  - historical and current trends in CPU development
- software for processing text, numeric, image, video and audio data
- non-computer tools and processing
  - documenting procedures to follow when processing

**storing and retrieving**
- hardware for storing and retrieving
  - hardware devices
  - hardware secondary storage devices, including magnetic disks

**displaying**
- displaying – the method by which information is output from the system to meet a purpose

- document the storage and retrieval process in an information system
- describe the characteristics and operation of hardware devices used for storage and retrieval
- describe the operation of display hardware
- compare and contrast displays created without a computer to those created with a computer
- identify, discuss and appreciate the widespread use of non-computer
<table>
<thead>
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<tbody>
<tr>
<td>• hardware for displaying, including:</td>
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<td>methods of displaying information</td>
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<tr>
<td>− screens (LCD, CRT and plasma screens) for displaying text, numbers, images and video</td>
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<tr>
<td>− printers and plotters for displaying text, numbers and images</td>
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<tr>
<td>• software for displaying</td>
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<tr>
<td>− interfaces for hardware display devices</td>
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<tr>
<td>− display features in applications packages, including:</td>
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<td>o reporting</td>
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<td>o formatting</td>
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<td>o spacing</td>
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<td>o merging</td>
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<td>o tables</td>
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<td></td>
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<tr>
<td>o charts</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• non-computer tools:</td>
<td></td>
<td></td>
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<tr>
<td>− traditional methods for displaying the different types of data</td>
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</tbody>
</table>

<p>| Planning                                         | collecting | organising |            |
| Teacher                                          |            |            |            |
| • provides students with individual assistance in documenting an appropriate plan |            |            |            |
| Students (project work)                          |            |            |            |
| • review the Gantt chart provided for their project to assist with their planning |            |            |            |
| • start documenting their system in more detail in terms of: |            |            |            |
|   − the hardware, software and non-computer tools |            |            |            |
|   − how data will be collected                    |            |            |            |
|   − how data can be best organised                |            |            |            |
| • choose the most appropriate combination of hardware, software and/or non-computer tools to collect data from a given source |            |            |            |
| • identify existing data that can be collected for an information system for a given scenario |            |            |            |
| • identify, for a given scenario, alternatives for data collection and choose the most appropriate one |            |            |            |
| • choose the most appropriate format for a given set of data and identify and describe the most appropriate software and method to organise it |            |            |            |
| • compare and contrast different methods          |            |            |            |</p>
<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>- how data will be analysed&lt;br&gt;- how data will be processed&lt;br&gt;- the best way to display information</td>
<td>analysing processing displaying</td>
<td>of organising the same set of data using existing software applications&lt;br&gt;assess future implications when making decisions about the way data is organised&lt;br&gt;select appropriate hardware configurations for a specified type of processing&lt;br&gt;choose and justify the most appropriate method for displaying information given a particular set of circumstances</td>
<td></td>
</tr>
<tr>
<td><strong>Designing</strong>&lt;br&gt;<strong>Teacher</strong>&lt;br&gt;• provides students with individual assistance in developing surveys and spreadsheet templates&lt;br&gt;<strong>Students (project work)</strong>&lt;br&gt;• design and print out their survey forms&lt;br&gt;• design a template for their spreadsheet system that best collects, organises and displays information</td>
<td>traditional stages in developing a system collecting displaying</td>
<td>• use a variety of design tools to help plan the structure of an information system&lt;br&gt;• design forms that allow data to be accurately recorded and easily input into software applications&lt;br&gt;• design a display for a wide variety of users</td>
<td></td>
</tr>
<tr>
<td><strong>Implementing</strong>&lt;br&gt;<strong>Teacher</strong>&lt;br&gt;• provides students with individual assistance in processing the information. Students may need help with formulas and layout&lt;br&gt;<strong>Students (project work)</strong>&lt;br&gt;• collect their survey data and enter it into their spreadsheet template&lt;br&gt;• manipulate the data in a variety of ways to generate information&lt;br&gt;• document the processing done by their</td>
<td>traditional stages in developing a system collecting organising</td>
<td>• use an information system to generate information&lt;br&gt;• select and use appropriate communication skills to conduct interviews and surveys so that data can be accurately collected&lt;br&gt;• use a range of hardware collection devices to collect different data types&lt;br&gt;• use software to combine data organised in different formats</td>
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<tr>
<td>Project activities/Integrated learning experiences</td>
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<tr>
<td>system using screen dumps where appropriate • draw conclusions from the information displayed</td>
<td>analysing processing displaying</td>
<td>• use software analysis features in a range of software applications to analyse audio, video, text and numeric data • analyse data on individuals for the purpose it was collected • edit numeric data using spreadsheets and database management systems • use a range of hardware and software combinations to display different types of information • format a text document with appropriate use of fonts, spacing and layout for printed and screen displays</td>
<td></td>
</tr>
<tr>
<td>Testing, evaluating and maintaining Students (project work) • test their system and modify its operation if needed • write a report indicating how they have tested and evaluated their system</td>
<td></td>
<td>• test and evaluate an existing system to see if it meets requirements and specifications • analyse and customise user interfaces and other tasks in applications software forming part of the solution</td>
<td></td>
</tr>
<tr>
<td>Teacher • provides student with the opportunity to demonstrate and explain their systems</td>
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Unit 4
Promoting a School Event

Syllabus topics covered
Introduction to information skills and systems
  • The nature of data and information
  • Reasons for digital data representation
Information processes
  • Collecting, organising, transmitting and receiving, storing and retrieving, displaying, integrated processes
Tools for carrying out information processes
  • Hardware devices, including keyboards, mice, LCD displays, magnetic disks, printers, flash memory, CPU, network storage
  • Software tools, including word processors, desktop publishing, web authoring, graphic and database applications
  • Non-computer procedures
Social and ethical issues
  • The impact of systems on participants and users
  • The difference between human-centred and machine-centred systems
  • Bias and accuracy of data collected
  • Privacy
  • Developer responsibilities
The roles of people developing systems and system complexity
  • Systems for individuals and/or organisation
  • Systems developed by individuals and/or teams
  • Roles played by team members
  • Strengths and weaknesses of team members
Traditional stages in developing a system
  • Understanding the problem
  • Planning
  • Designing
  • Implementing
  • Testing, evaluating and maintaining
System documentation
  • Diagrammatically represent the information system in context
  • Use surveys and interviews to collect system information
  • Produce a report describing the user needs for a system
  • Interpreting system specifications and Gantt charts

Unit overview and rationale
This is a project-driven topic which focuses on the development of skills through the use of a wide variety of hardware and software tools. The project will require students to present information in a variety of formats and will involve the use of web development software, desktop publishing software, communication tools and graphics software. The focus will be on the team and its ability to work effectively following the traditional stages of systems development.

Unit length: 7 weeks

Targeted outcomes (outcomes in bold font to be assessed)
P1.1 describes the nature of information processes and information technology
P1.2 classifies the functions and operations of information processes and information technology
P2.1 identifies and describes the information processes within an information system
P2.2 recognises and explains the interdependence between each of the information processes
P3.1 identifies and describes social and ethical issues
P5.1 selects and ethically uses computer based and non-computer based resources and tools to process information
P6.1 analyses and describes an identified need
P6.2 generates ideas, considers alternatives and develops solutions for a defined need
P7.1 recognises, applies and explains management and communication techniques used in individual and team-based project work
P7.2 uses and justifies technology to support individuals and teams

Assessment
The unit will be assessed directly through the use of project work. The project will make up 30% of the overall assessment.

Quality teaching focus
This unit follows a productive pedagogy, with the main focus being on the learning environment. Social support and engagement is the key. Students will need to communicate effectively within the team and support one another to complete the project. Students will work to their strengths to achieve a quality outcome. Substantive communication will be maintained through regular team meetings.
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Project description: promoting a school event</strong></td>
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<tr>
<td>The aim of this project is for a team of students to set up an information system to promote a school event. The system should make effective use of software such as web authoring software, graphics software, desktop publishing software, database software, word processing software and communication software</td>
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<td>Some suitable events could include a school formal, a school dance, a school trivia night, a school speech day, SRC elections, prefect elections, a fundraising dinner</td>
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<tr>
<td>Each team will need to use relevant software and hardware to provide:</td>
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<tr>
<td>• an A3 poster promoting the event that can be put up around the school and the local community</td>
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<td>• a website that can be added via a hyperlink to the school’s website</td>
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<td>• relevant information about people involved in the event, eg organisers, candidates, delegates, groups or individuals</td>
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<td>• a personalised letter promoting the event that can be mailed or emailed</td>
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<tr>
<td>Throughout the project, teams must keep track of their progress by recording what each individual has done towards designing and implementing the systems. The journal entries should describe how the technology was used and identify the individual tasks completed</td>
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### Understanding the problem

**Teacher**
- provides each team with details of the task
- provides individual team members with a log book for recording journal entries
- explains the project task to students and provides the students with an assessment rubric for the task
- briefly revises the concepts associated with the traditional stages in developing a system, roles of people involved in system development and the strengths and weaknesses of team members

**Teacher**
- outlines the complexity of the systems in terms of the various data types and their representation
- provides students with a worksheet to help students focus on the data requirements of their system
- initiates class discussion on the current trends in representing data and information

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</table>
| Understanding the problem                          | the nature of data and information | • distinguish between data and information in a given context  
• categorise data as image, audio, video, text and/or numbers  
• identify the data and the information into which it is transformed, for a given scenario  | | |
| Teacher                                            |                      | • identify examples of information systems that use information from another information system as data  
• explain why information technology uses digital data  
• describe advantages and disadvantages for the digital representation of data  | | |
| reasons for digital data representation            |                      | • recognise and apply appropriate stages in their project work  
• read and interpret the requirements for a new system in terms of:  
  – the needs of the users of the information system  
  – who the participants are  | | |
| traditional stages in developing a system          |                      | | |
| Teacher                                            |                      | | |
| • needs to ensure that each individual and team has a good knowledge and understanding of the main concepts before students undertake any planning or designing  
• assists individual groups as the need arises  | | | |
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<tbody>
<tr>
<td><strong>Students (project work)</strong></td>
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<td>• organise a team meeting to talk through the project and identify the contributions each individual can make to that team</td>
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<td>• develop a list of personal skills they need to work on during this project. (Students could submit this list to the teacher for review before further action on the project)</td>
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<tr>
<td>• organise a meeting to identify the social and ethical considerations involved with the project</td>
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<tr>
<td><strong>complexity of systems</strong></td>
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<td>• systems for individuals</td>
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<td>• systems for organisations</td>
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<tr>
<td>• systems developed by teams</td>
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<tr>
<td><strong>roles of people involved in systems development</strong></td>
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<tr>
<td>• different roles played by individuals in the team and communication between them</td>
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<td>• strengths and weaknesses of individual team members</td>
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<tr>
<td>- communication</td>
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<td>- interpersonal</td>
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<td>- technical</td>
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<td>- organisational</td>
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<tr>
<td><strong>social and ethical issues</strong></td>
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<td>• machine-centred systems simplify what computers do at the expense of participants</td>
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<tr>
<td>• human-centred systems as those that make participants’ work as effective and satisfying as possible</td>
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<tr>
<td>• how the relationships between participants change as a result of the new system</td>
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<tr>
<td>• ensuring the new system provides participants with a safe work environment</td>
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<tr>
<td>• awareness of the impact the system may have on the participants, including:</td>
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<tr>
<td>- opportunities to use their skills</td>
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<tr>
<td>- meaningful work</td>
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<tr>
<td>- need for change</td>
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</tbody>
</table>

- the data/information to be used
- required information technology
- information processes

• recognise the resources that are relevant, available and required for use in developing the system
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• research and describe the operation of scanners and digital cameras and decide whether or not they have a place in collecting information for the system</td>
<td>opportunities for involvement and commitment</td>
<td>recognise personal bias and explain its impact on data collection</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• provides students with ideas of how a database could be used for their project and demonstrates the key database principles. This may include providing students with sample databases</td>
<td>social and ethical issues arising from the processing of information, including:</td>
<td>identify the privacy implications of particular situations and propose strategies to ensure they are respected</td>
<td></td>
</tr>
<tr>
<td>• identifies the need for students to be accurate in their collection of relevant data and provides a strategy for teams to collect appropriate data</td>
<td>- privacy of the individual</td>
<td>predict errors that might flow from data inaccurately collected</td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• investigate different methods of designing forms for data collection using a database</td>
<td>collecting - the process by which data is captured or entered into a computer system, including:</td>
<td>predict issues when collecting data that might arise when it is subsequently analysed and processed</td>
<td></td>
</tr>
<tr>
<td>• carry out workshop exercises to design and build a simple database</td>
<td>- deciding what data is required</td>
<td>describe the operation of a range of hardware collection devices</td>
<td></td>
</tr>
<tr>
<td>• generate a list of features detailing good form design principles</td>
<td>- how it is sourced</td>
<td>make predictions about new and emerging trends in data collection based on past practices</td>
<td></td>
</tr>
</tbody>
</table>

**Project activities**

<table>
<thead>
<tr>
<th>Students learn about</th>
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</thead>
<tbody>
<tr>
<td>collecting - the process by which data is captured or entered into a computer system, including:</td>
</tr>
<tr>
<td>- deciding what data is required</td>
</tr>
<tr>
<td>- how it is sourced</td>
</tr>
<tr>
<td>- how it is encoded for entry into the system</td>
</tr>
<tr>
<td>hardware used for collection</td>
</tr>
<tr>
<td>- scanners and/or digital cameras to collect images</td>
</tr>
<tr>
<td>- keyboards and/or optical character readers to collect numbers and text</td>
</tr>
<tr>
<td>software used for collection</td>
</tr>
<tr>
<td>- device drivers that allow hardware to interface with the operating system</td>
</tr>
<tr>
<td>- software that allows participants to enter or import data</td>
</tr>
<tr>
<td>- software that allows participants to move data between applications</td>
</tr>
<tr>
<td>non-computer procedures in collecting</td>
</tr>
<tr>
<td>- literature searches</td>
</tr>
<tr>
<td>- surveys and interviews</td>
</tr>
<tr>
<td>- form design for data collection</td>
</tr>
<tr>
<td>- manual recording of events</td>
</tr>
<tr>
<td>Project activities/integrated learning experiences</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
</tbody>
</table>
|                                                  | - existing non-computer data  
|                                                  | • social and ethical issues in collecting  
|                                                  |   - bias in the choice of what and where to collect data  
| Teacher                                          | - accuracy of the collected data  
|                                                  | - copyright and acknowledgment of source data when collecting  
|                                                  | - the rights to privacy of individuals on whom data is collected  
|                                                  | - ergonomic issues for participants entering large volumes of data into an information system  
|                                                  | **organising**  
|                                                  | • organising – the process by which data is structured into a form appropriate for use by other information processes  
|                                                  | • how different methods of organising affect processing, for example:  
|                                                  |   - letters of the alphabet represented as images rather than text  
|                                                  |   - numbers represented as text rather than numeric  
|                                                  | • the way in which the hardware used for collection organises data by digitising images, audio, video, numeric and text  
|                                                  | • software for organisation  
| Students                                         |   - paint and draw software that allows image manipulation  
|                                                  |   - word processors and desktop publishing for the arrangement of text, images and numbers for display  
|                                                  |   - website creation software that uses hyperlinks to organise data to be displayed in web pages  
|                                                  |   - presentation software allowing data to | • describe how different types of data are digitised by the hardware that collects it  

Teacher
- gives a presentation on the organisational structure of databases
- provides models of past students' work (posters and websites) for students to examine

Students
- analyse the information presented in past projects and comment on its organisation and the tools that would have been used to create that organisation
- examine and review the features provided by web creation software, desktop publishing software and database management software
<table>
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</thead>
</table>
| be arranged on slides, providing control over the sequence in which information is displayed | • non-computer tools for organising  
  – hard copy systems such as phone books, card catalogues and pen and paper forms  
  – pen and paper methods for organising data  
  • social and ethical issues associated with organising, including:  
    – current trends in organising data, such as:  
      o the increase in hypermedia as a result of the World Wide Web  
      o the ability of software to access different types of data  
      o a greater variety of ways to organise resulting from advances in display technology  
    – the cost of poorly organised data, such as redundant data in a database used for mail-out | | |
| • identify examples of potential human bias in data processing | | | |
| analysing | • non-computer tools, for analysing, including:  
  – searching manual filing systems  
  – non-computer models and simulations | | |
<p>| processing | • processing – a method by which data can be manipulated in different ways to produce a new value or result (eg calculating a total, filtering an email, | | |</p>
<table>
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</thead>
</table>
| **Students**                                      | changing the contrast of an image, changing the volume of a wave file)  
  • software for processing text, numeric, image, video and audio data  
  • social and ethical issues associated with processing  
    – ownership of processed data  
    – bias in the way participants in the system process data  
  **storing and retrieving**  
  • storing and retrieving – the two-step process by which data or information can be saved and reloaded to allow for:  
    – other processing to take place  
    – a temporary halt in the system  
    – backup and recovery  
    – the transfer of data or information  
  • hardware for storing and retrieving  
    – hardware devices  
    – hardware secondary storage devices, including:  
      o magnetic disks  
      o optical disks  
      o network storages  
      o flash memory  
      o magnetic tapes  
    – the characteristics of hardware, including:  
      o random or sequential access  
      o volatile or non-volatile  
      o permanent or non-permanent  
      o the trend to faster and greater storage capacity over time  
  • software for storing and retrieving  
    – database management systems | **Teacher**  
  • follows up on student research activities by engaging students in whole-class discussions on data storage and file formats |  
  • describe the characteristics and operation of hardware devices used for storage and retrieval  
  • compare different file formats for storing the same data, explaining the features and benefits of each | **Registration** |

**Students**  
- complete an activity on Internet browsers to gain an understanding of search engines and machine-independent data  
- research and describe types of secondary storage devices that would be useful for their project  
- research and document the file formats required to store data of different data types

**Teacher**  
- follows up on student research activities by engaging students in whole-class discussions on data storage and file formats
### Project activities/integrated learning experiences

<table>
<thead>
<tr>
<th>Students learn about</th>
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<th>Registration</th>
</tr>
</thead>
</table>
| − file formats for different data types  
− Internet browser  
− used to access a machine-independent data store  
− using search engines to access data  
− non-computer tools, including:  
− paper based storage systems  
− microfiche  
− libraries  
− social and ethical issues, including:  
− the security of stored data  
− unauthorised retrieval of data  
− advances in storage and retrieval technologies and new uses such as data matching  
| − differentiate between the requirements for a local area network and a wide area network  
| − describe concepts of downloading, uploading and streaming  
− compare and contrast computer and non-computer based communication systems  
∞ describe and employ net-etiquette when using the Internet  
| predict and discuss possible future trends in communications and the impact they are likely to have on the transmitting and receiving of data/information  
− transmitting and receiving – the process that transfers information and data within and between information systems  
− hardware for transmitting and receiving  
− communications within a computer between peripheral devices and the CPU via buses  
− the role of modems, including modulation and demodulation  
− local area networks and wide area networks  
− software for transmitting and receiving  
− communications packages  
− transmitting and receiving text, numeric, image, audio and video  
− electronic mail and its operation  
− non-computer tools for transmitting and receiving, such as mail, phone, fax and |

### Teacher
- conducts a number of short discussions about the role of networks and communication systems in disseminating information to ‘promote an event’
- covers the concept of transmitting and receiving; the role of modems, how the CPU works, how web pages are accessed, email and its operation, etc

### Students
- complete worksheet activities to cement the metalanguage used in transmitting and receiving

---

**transmitting and receiving**
- transmitting and receiving – the process that transfers information and data within and between information systems
- hardware for transmitting and receiving
- communications within a computer between peripheral devices and the CPU via buses
- the role of modems, including modulation and demodulation
- local area networks and wide area networks
- software for transmitting and receiving
- communications packages
- transmitting and receiving text, numeric, image, audio and video
- electronic mail and its operation
- non-computer tools for transmitting and receiving, such as mail, phone, fax and
<table>
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<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (project work)</td>
<td></td>
<td></td>
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<tr>
<td>• research and describe the most appropriate ways in which information is displayed for their promotion and the hardware tools used</td>
<td></td>
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<tr>
<td>Students</td>
<td></td>
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<tr>
<td>• examine websites that display information effectively and create a list of good design principles to be used as a guide when creating their websites</td>
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<tr>
<td>radio and television (transmit only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• social and ethical issues associated with transmitting and receiving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– accuracy of data received from the Internet</td>
<td></td>
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<tr>
<td>– security of data being transferred</td>
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<td></td>
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<tr>
<td>– net-etiquette</td>
<td></td>
<td></td>
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<tr>
<td>– acknowledgment of data source</td>
<td></td>
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<tr>
<td>– global network issues, time zones, date fields, exchange rates</td>
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<tr>
<td>– changing nature of work for participants, such as work from home and telecommuting</td>
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<tr>
<td>– current developments and future trends in digital communications, radio and television</td>
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<tr>
<td>– the impact of the Internet on traditional business</td>
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<tr>
<td>displaying</td>
<td></td>
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<tr>
<td>• displaying – the method by which information is output from the system to meet a purpose</td>
<td></td>
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<tr>
<td>• hardware for displaying, including:</td>
<td></td>
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<tr>
<td>– screens (LCD, CRT and plasma screens) for displaying text, numbers, images and video</td>
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<td></td>
</tr>
<tr>
<td>– printers and plotters for displaying text, numbers and images</td>
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<td></td>
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<tr>
<td>• software for displaying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– interfaces for hardware display devices</td>
<td></td>
<td></td>
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<tr>
<td>– display features in applications packages, including:</td>
<td></td>
<td></td>
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<tr>
<td>o reporting</td>
<td></td>
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<tr>
<td>• describe the operation of display hardware</td>
<td></td>
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<tr>
<td>• compare and contrast displays created without a computer to those created with a computer</td>
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<tr>
<td>• identify, discuss and appreciate the widespread use of non-computer methods of displaying information</td>
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</tbody>
</table>
### Project activities/Integrated learning experiences

<table>
<thead>
<tr>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>o formatting</td>
<td>• recognise that processes can overlap, be concurrent or independent or not significant in a specific system</td>
<td></td>
</tr>
<tr>
<td>o spacing</td>
<td></td>
<td></td>
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<tr>
<td>o merging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o tables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• non-computer tools:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- traditional methods for displaying the different types of data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• social and ethical issues associated with displaying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- communication skills of those presenting displays</td>
<td></td>
<td></td>
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<tr>
<td>- past, present and emerging trends in displays</td>
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<tr>
<td>- appropriate displays for a wide range of audiences, including:</td>
<td></td>
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<tr>
<td>o standards for display for the visually impaired</td>
<td></td>
<td></td>
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<tr>
<td>o displays suitable for young children</td>
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</tr>
</tbody>
</table>

#### Teacher

- conducts a brief discussion on how all the information processes are integrated and how the data from one process affects another

#### Planning

**Students (project work)**

- meet to develop and document a list of roles and technical skills required to complete the project 'to promote a school event'

- meet as a group to plan their project identifying and documenting:
  - the hardware, software and non-

**social and ethical issues**

- ensure that relevant social and ethical issues are addressed

**roles of people involved in systems development**

- produce a report stating the need, and how an information system will meet it

**collecting**

- choose the most appropriate combination of hardware, software and/or non-computer tools to collect data
### Project activities/Integrated learning experiences

<table>
<thead>
<tr>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students learn about computer tools</td>
<td>from a given source • identify existing data that can be collected for an information system for a given scenario • identify, for a given scenario, alternatives for data collection and choose the most appropriate one</td>
<td></td>
</tr>
<tr>
<td>− how data will be collected</td>
<td></td>
<td></td>
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<tr>
<td>− how data can be best organised</td>
<td></td>
<td></td>
</tr>
<tr>
<td>− the best way to display information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>− who will do what</td>
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</tbody>
</table>

**Teacher**
- provides guidance and feedback to individuals and teams
- monitors the progress of students and teams

<table>
<thead>
<tr>
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<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>organising</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• chooses the most appropriate format for a given set of data and identify and describe the most appropriate software and method to organise it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• assess future implications when making decisions about the way data is organised</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>• compare and contrast different methods of organising the same set of data using existing software applications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• select a relevant technology for a given situation to allow computers to transmit and receive data or information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• choose and justify the most appropriate method for displaying information given a particular set of circumstances</td>
<td></td>
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</tr>
</tbody>
</table>

| **transmitting and retrieving** | | | |
| **displaying** | | | |

<p>| <strong>Designing Students (project work)</strong> | traditional stages in developing a system | | |
| <strong>roles of people involved in systems development</strong> | | | |
| Teacher | | | |
| • use a variety of design tools to help plan the structure of an information system | | |
| • diagrammatically represent the information system in context | | |
| • document the relationship between the new system, user of the information | | |</p>
<table>
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<th>Students learn to</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• provides guidance and feedback to individuals and teams. Teachers should be conscious about assessment for learning during this stage of the project</td>
<td>collecting</td>
<td>system and their need(s)</td>
<td>• design forms that allow data to be accurately recorded and easily input into software applications</td>
</tr>
<tr>
<td></td>
<td>displaying</td>
<td></td>
<td>• design and develop a simple web page</td>
</tr>
<tr>
<td>Implementing Students (project work)</td>
<td>traditional stages in developing a system</td>
<td>• design a display for a wide variety of users</td>
<td></td>
</tr>
<tr>
<td>• implement their designs (the quality of the systems will be reflected in the efficiencies built into the system as well as the quality of information generated by the system)</td>
<td>roles of people involved in systems development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>social and ethical issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• provides guidance and feedback to individuals and teams</td>
<td>collecting</td>
<td></td>
<td>• use an information system to generate information</td>
</tr>
<tr>
<td></td>
<td>organising</td>
<td></td>
<td>• analyse and customise user interfaces and other tasks in applications software forming part of the solution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• identify the training needs of users of the information system</td>
</tr>
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<td></td>
<td>• document the processes to be followed by participants</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>• implement systems that pay as much attention to the needs of participants as they do to information technology</td>
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<td></td>
<td></td>
<td></td>
<td>• describe social and ethical issues that relate to:</td>
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<td></td>
<td></td>
<td></td>
<td>− information system users</td>
</tr>
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<td></td>
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<td></td>
<td>− participants</td>
</tr>
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<td></td>
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<td></td>
<td>• use a range of hardware collection devices to collect different data types</td>
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<tr>
<td></td>
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<td></td>
<td>• use the Internet to locate data for a given scenario</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• use software to combine data organised in different formats</td>
</tr>
</tbody>
</table>
| | | | • use data dictionaries to describe the
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<tbody>
<tr>
<td></td>
<td>processing</td>
<td>organisation of data within a given system</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• edit text data using word processors, desktop publishing, hypertext and database management systems</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• edit numeric data using spreadsheets and database management systems</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• edit image data using paint, draw and animation packages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>storing and retrieving</td>
<td>• diagrammatically represent data processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• document the storage and retrieval process in an information system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>transmitting and receiving</td>
<td>• use a range of hardware devices and associated software to store and retrieve information and data</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• store and retrieve data using a network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>displaying</td>
<td>• use software features to secure stored data and information</td>
<td></td>
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<td>• retrieve and use data in an ethical way</td>
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<td>• transfer numeric, text, image, audio and video data and discuss the time to transfer and required bandwidth</td>
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<td>• demonstrate sending and receiving mail, with attachments, over an e-mail system</td>
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<td>• use a range of hardware and software combinations to display different types of information</td>
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<td>• format a text document with appropriate use of fonts, spacing and layout for printed and screen displays</td>
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<td>• generate reports for display within a</td>
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<td>database</td>
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<td>• mail-merge information from a database into another application for display</td>
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<td>Testing, evaluating and maintaining Teacher</td>
<td>roles of people involved in systems development</td>
<td>• analyse and customise user interfaces and other tasks in applications software forming part of the solution</td>
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<td>• set up displays of student work</td>
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## Unit 5
### Making A Movie

### Unit overview and rationale
This topic is based on an individual project. The project will focus on collecting, organising, processing, storing and displaying video and audio information. Students will select from a range of predefined topics to allow them to connect with the information. Emphasis will be placed on system documentation following the stages in the traditional system development approach. Students will encounter a number of problems during implementation of their video which will require solutions.

### Unit length:
5 weeks

### Syllabus topics covered
**Introduction to information skills and systems**
- The nature of data and information
- Reasons for digital data representation

**Information processes**
- Collecting, organising, storing and retrieving, processing, displaying

**Tools for carrying out information processes**
- Hardware devices, including keyboards, mouses, LCD displays, microphones, digital cameras, video cameras, digital projectors, speakers, CPU, network storage
- Software tools, including word processors, graphics software, video processing software, animation software and audio applications
- Non-computer procedures

**Social and ethical issues**
- The impact of systems on participants and users
- Privacy
- Appropriate use of information
- Developer responsibilities

**Traditional stages in developing a system**
- Understanding the problem
- Planning
- Designing
- Implementing
- Testing, evaluating and maintaining

**System documentation**
- Diagrammatically represent the information system in context
- Produce a report describing the user needs for a system
- Interpreting system specifications and Gantt charts

### Targeted outcomes (Outcomes in **bold font** to be assessed)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>P1.1</strong></td>
<td>describes the nature of information processes and information technology</td>
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<tr>
<td><strong>P2.1</strong></td>
<td>identifies and describes the information processes within an information system</td>
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<td><strong>P3.1</strong></td>
<td>identifies and describes social and ethical issues</td>
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<td><strong>P5.1</strong></td>
<td>selects and ethically uses computer based and non-computer based resources and tools to process information</td>
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<td><strong>P6.1</strong></td>
<td>analyses and describes an identified need</td>
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<td><strong>P6.2</strong></td>
<td>generates ideas, considers alternatives and develops solutions for a defined need</td>
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<tr>
<td><strong>P7.1</strong></td>
<td>recognises, applies and explains management and communication techniques used in individual and team-based project work</td>
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<tr>
<td><strong>P7.2</strong></td>
<td>uses and justifies technology to support individuals and teams</td>
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### Assessment
The unit will be assessed directly through the use of project work. The project will make up 15% of the overall assessment.

### Quality teaching focus
This unit focuses on connectedness and engagement. Students choose a theme they can identify with to produce a three-minute movie. The project reinforces the stages in the traditional approach to system development and provides students with the opportunity to explore an area they are interested in. The key to the successful completion of the project is how well each student manages their own time.
### Project description
In this unit students are required to create a three- or four-minute movie following the traditional approach to systems development. While ‘creating a movie’ does not strictly involve the creation of an information system, students will be following the traditional approach throughout this project. The key to this activity is the student’s time management and their documentation of what they have done in each stage of the project.

Students may select from a number of different personal interest themes, such as:
- a training video on road safety
- recycling
- our environment documentary
- wildlife in my back yard
- a music video
- adding a sound track to a cartoon
- French manicure made easy
- a cooking video
- stop motion animation

Students must demonstrate and document how they manipulate and edit video and audio data, showing an appreciation of digital data representation.

### Teacher
- explains the project to students and provides the students with an assessment rubric for the project

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<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
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<th>Registration</th>
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<td><strong>Project description</strong></td>
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<td>management and their documentation of what they</td>
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<td>have done in each stage of the project.</td>
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<td>• a cooking video</td>
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<td>• stop motion animation</td>
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<td>and choose from a variety of system tools</td>
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<td>Students must demonstrate and document how they</td>
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<td>manipulate and edit video and audio data, showing</td>
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<td>an appreciation of digital data representation</td>
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<td>• explains the project to students and provides</td>
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<td><strong>Understanding the problem</strong></td>
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<td><strong>Teacher</strong></td>
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<tr>
<td>• organises a number of small practical exercises to build expertise in manipulating video and audio data. A number of software tools can be used to develop this expertise (the focus should be on the characteristics of audio and video data)</td>
<td>complexity of systems • systems for individuals • systems developed by individuals</td>
<td>• ensure that relevant social and ethical issues are addressed</td>
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<tr>
<td><strong>Students</strong></td>
<td>the nature of data and information • data – the input to an information system • data representation – the different types of media, namely: − images − audio − video</td>
<td>• identify, for a given scenario, alternatives for data collection and choose the most appropriate one • describe the operation of a range of hardware collection devices</td>
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<td>• watch a series of ‘how to’ videos demonstrating how video and audio are manipulated • complete small exercises</td>
<td>reasons for digital data representation • current data digitising trends, for example: − newspapers on the Internet − telephone system − video on DVD − facsimile − media retrieval management</td>
<td>•</td>
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<td>• examine and compare the output from different sources and justify the trends towards digital output • examine the characteristics of information technology which makes it necessary to use digital data</td>
<td>social and ethical issues • social and ethical issues arising from the processing of information, including: − privacy of the individual − appropriate information use • the ethical and social responsibility of developers</td>
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<td><strong>Teacher</strong></td>
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<td>• gives a presentation on the technical aspects of manipulating audio and video, such as frame rates, resolution, compression codecs, scene length, transitions, etc, and social and ethical considerations</td>
<td>collecting • collecting – the process by which data is captured or entered into a computer system, including: − deciding what data is required</td>
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<td><strong>Students</strong></td>
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<td>• complete a worksheet designed to reinforce the metalanguage associated with video and audio</td>
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<td>Project activities/Integrated learning experiences</td>
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</table>
| • research how both an analog and a digital video camera captures and stores data | – how it is sourced  
– how it is encoded for entry into the system | • make predictions about new and emerging trends in data collection based on past practices | • identify the privacy implications of particular situations and propose strategies to ensure they are respected |
| • identify the social and ethical issues associated with videoing others or using existing video and audio | • hardware used for collection  
– scanners and/or digital cameras to collect images  
– microphones and/or recording from peripheral devices to collect audio  
– video cameras and/or peripheral devices with appropriate interfaces to capture video | • identify the privacy implications of particular situations and propose strategies to ensure they are respected | |
| | • software used for collection  
– device drivers that allow hardware to interface with the operating system  
– software that allows participants to enter or import data  
– software that allows participants to move data between applications | | |
| | • social and ethical issues in collecting  
– bias in the choice of what and where to collect data  
– copyright and acknowledgment of source data when collecting  
– the rights to privacy of individuals on whom data is collected | | |
| | • organising – the process by which data is structured into a form appropriate for use by other information processes  
• the way in which the hardware used for collection organises data by digitising images, audio, video, numeric and text  
• software for organisation  
– paint and draw software that allows image manipulation | | |
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<td>- mixing software for audio manipulation</td>
<td>• compare different file formats for storing the same data, explaining the features and benefits of each</td>
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<td>- video processing software that allows arrangement of video and audio clips on a time line</td>
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<td><strong>storing and retrieving</strong></td>
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<td>• storing and retrieving – the two-step process by which data or information can be saved and reloaded to allow for:</td>
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<td>- other processing to take place</td>
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<td>- a temporary halt in the system</td>
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<td>- backup and recovery</td>
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<td>- the transfer of data or information</td>
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<td>• hardware for storing and retrieving</td>
<td>• social and ethical issues, including:</td>
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<td>- hardware devices</td>
<td>- the security of stored data</td>
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<td>- hardware secondary storage devices, including:</td>
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<td>o network storages</td>
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<td>o flash memory</td>
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<td>o magnetic tapes</td>
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<td>• the trend to faster and greater storage capacity over time</td>
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<td>• software for storing and retrieving</td>
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<td>- hardware interface software</td>
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<td>- file formats for different data types</td>
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<td><strong>Teacher</strong></td>
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<td>• leads discussions about the processing</td>
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<td>demands of video and audio data and its</td>
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<td>implications for the project</td>
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<td><strong>Students</strong></td>
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<td>• complete two simple exercises: one for video</td>
<td>processing – a method by which data can be manipulated in different ways to produce a new value or result (eg calculating a total, filtering an email, changing the contrast of an image, changing the volume of a wave file)</td>
<td>diagrammatically represent data processing</td>
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<td>and the other for audio. Using pre-existing</td>
<td>• hardware in</td>
<td>identify examples of potential human bias in data processing</td>
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<td>footage, students should be given time to</td>
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<td>familiarise themselves with the editing</td>
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<td>displaying, including:</td>
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<td>Students (project work)</td>
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<td>• document their own requirements for their</td>
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<td>movie, paying particular attention to a set of</td>
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<td>standards that they can evaluate their movie</td>
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<td>• consider and document aspects relating to</td>
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<tr>
<td>each of the information processes at this stage</td>
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<td>• research how speakers work</td>
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<td><strong>Students</strong></td>
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<tr>
<td>• document their own requirements for their</td>
<td>• describe the</td>
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<td>movie, paying particular attention to a set of</td>
<td>operation of display</td>
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<td>standards that they can evaluate their movie</td>
<td>hardware</td>
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<td>against</td>
<td>• compare and contrast displays created without a computer to those created with a computer</td>
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<td>• consider and document aspects relating to</td>
<td>• identify, discuss</td>
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<td>each of the information processes at this stage</td>
<td>and appreciate the</td>
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<td>widespread use of</td>
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<td>non-computer methods</td>
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<td>of displaying</td>
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<td>Project activities/Integrated learning experiences</td>
<td>Students learn about</td>
<td>Students learn to</td>
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<td>screens) for displaying images and video</td>
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<td></td>
<td>– speakers for audio output</td>
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<td></td>
<td>– digital projectors and interactive whiteboards for displaying text, numbers, images and video</td>
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<td></td>
<td>• software for displaying</td>
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<td></td>
<td>– interfaces for hardware display devices</td>
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<tr>
<td></td>
<td>• non-computer tools:</td>
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<td></td>
<td>– traditional methods for displaying the different types of data</td>
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<td></td>
<td>• social and ethical issues associated with displaying</td>
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<td>– communication skills of those presenting displays</td>
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<td>– past, present and emerging trends in displays</td>
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<td>– appropriate displays for a wide range of audiences, including:</td>
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<td></td>
<td>o standards for display for the visually impaired</td>
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<td></td>
<td>o displays suitable for young children</td>
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Planning

**Students (project work)**

- use the models of Gantt charts presented earlier in the course as a template for developing their own using Word, Visio or MS Project
- document the information technology they will need to complete their project
- create a document template to keep an electronic log/journal record of what they do each day towards their project

**complexity of systems**

- systems for individuals
- systems developed by individuals

- diagrammatically represent the information system in context
- read a set of specifications
- understand the need for a time schedule
- understand the need for journals and diaries
- interpret Gantt charts
- recognise the resources that are relevant, available and required for use
### Project activities/Integrated learning experiences

<table>
<thead>
<tr>
<th>Students learn about</th>
<th>Students learn to</th>
<th>Registration</th>
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<tbody>
<tr>
<td>roles of people involved in systems development</td>
<td>in developing the system</td>
<td>• modify or extend an existing system according to specifications</td>
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<tr>
<td>collecting</td>
<td>• produce a report stating the need, and how an information system will meet it</td>
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<td></td>
<td>• choose the most appropriate combination of hardware, software and/or non-computer tools to collect data from a given source</td>
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<td></td>
<td>• predict issues when collecting data that might arise when it is subsequently analysed and processed</td>
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### Designing

**Teacher**
- outlines the principles of movie making, including types of shots used in video production and the effect each shot has on the audience
- discusses the importance of producing a script and what it includes (two-column format describing the audio and image content within a video)
- revises storyboard concepts and demonstrates how storyboards are used to plan a video. The discussion should include what is included in a video storyboard: scene description, camera angle, audio, transitions, etc
- describes and provides students with examples of shot list

**Students (project work)**
- create a script, storyboard and shot list for

<p>| traditional stages in developing a system | use a variety of design tools to help plan the structure of an information systems |
| collecting | • identify existing data that can be collected for an information system for a given scenario |
| organising | • use the Internet to locate data for a given scenario |
| displaying | • choose the most appropriate format for a given set of data and identify and describe the most appropriate software and method to organise it |
| | • design a display for a wide variety of users |</p>
<table>
<thead>
<tr>
<th>Project activities/Integrated learning experiences</th>
<th>Students learn about</th>
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<tbody>
<tr>
<td>their movie, identifying all the key data elements</td>
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<tr>
<td>• enter details in electronic log/journal</td>
<td>traditional stages in developing a system</td>
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<td></td>
<td>collecting</td>
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<td></td>
<td>organising</td>
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<td></td>
<td>storing and retrieving</td>
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<tr>
<td>Implementing Students (project work)</td>
<td>use an information system to generate information</td>
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<tr>
<td>• collect, organise, process and store the raw images, video and audio data needed for their movie</td>
<td>use a range of hardware collection devices to collect different data types</td>
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<tr>
<td>• compile their movie, adding transitions, text and effects, where appropriate</td>
<td>describe how different types of data are digitised by the hardware that collects it</td>
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<td>• enter details in electronic log/journal</td>
<td>compare and contrast different methods of organising the same set of data using existing software applications</td>
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<td></td>
<td>assess future implications when making decisions about the way data is organised</td>
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<td></td>
<td>choose and justify the most appropriate method for displaying information given a particular set of circumstances</td>
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<td></td>
<td>use software to combine data organised in different formats</td>
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<td>• process their movie for storage on the network and output this to a DVD</td>
<td>document the storage and retrieval process in an information system</td>
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<tr>
<td>• enter details in electronic log/journal</td>
<td>describe the characteristics and operation of hardware devices used for storage and retrieval</td>
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<td>use a range of hardware devices and associated software to store and retrieve information and data</td>
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<td></td>
<td>store and retrieve data using a network</td>
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<td></td>
<td>use software features to secure stored data and information</td>
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<td>retrieve and use data in an ethical way</td>
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<td></td>
<td>processing</td>
<td>• select appropriate hardware configurations for a specified type of processing</td>
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<td>• edit video data using animation packages</td>
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<td>• edit audio data using mixing software</td>
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<td>• use a range of hardware and software combinations to display different types of information</td>
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<td></td>
<td>displaying</td>
<td>• create audio, image and video displays with presentation software</td>
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<tr>
<td>Testing, evaluating and maintaining Students (project work)</td>
<td>present their movies to the rest of the class</td>
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<td>evaluate each others movies against a given set of criteria and justify what they like and dislike about the organisation of information in the movie</td>
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