OCR
RECOGNISING ACHIEVEMENT

Support Materials

A2 Level ICT H517:

Unit G063

This booklet contains the following support materials:

- **Scheme of Work**
- **Lesson Plans**

AS/A Level ICT

Contents

Introduction

Background

A new structure of assessment for A Level has been introduced, for first teaching from September 2008. Some of the changes include:

- The introduction of stretch and challenge (including the new A* grade at A2) – to ensure that every young person has the opportunity to reach their full potential

- The reduction or removal of coursework components for many qualifications – to lessen the volume of marking for teachers

- A reduction in the number of units for many qualifications – to lessen the amount of assessment for learners

- Amendments to the content of specifications – to ensure that content is up-to-date and relevant.

OCR has produced an overview document, which summarises the changes to ICT. This can be found at **www.ocr.org.uk,** along with the new specification.

In order to help you plan effectively for the implementation of the new specification we have produced this Scheme of Work and Sample Lesson Plans for ICT. These Support Materials are designed for guidance only and play a secondary role to the Specification.

Our Ethos

All our Support Materials were produced 'by teachers for teachers' in order to capture real life current teaching practices and they are based around OCR's revised specifications. The aim is for the support materials to inspire teachers and facilitate different ideas and teaching practices.

In some cases, where the Support Materials have been produced by an active teacher, the centre logo can be seen in the top right hand corner

Each Scheme of Work is provided in:

- PDF format – for immediate use

- Word format – so that you can use it as a foundation to build upon and amend the content to suit your teaching style and students' needs.

The Scheme of Work provide examples of how to teach this unit and the teaching hours are suggestions only. Some or all of it may be applicable to your teaching.

The Specification is the document on which assessment is based and specifies what content and skills need to be covered in delivering the course. At all times, therefore, this Support Material booklet should be read in conjunction with the Specification. If clarification on a particular point is sought then that clarification should be found in the Specification itself.

A Guided Tour through the Scheme of Work

= Innovative Teaching Idea
This icon is used to highlight exceptionally innovative ideas.

= Stretch & Challenge Activity
This icon is added at the end of text when there is an explicit opportunity to offer Stretch and Challenge.
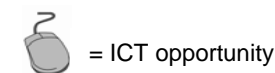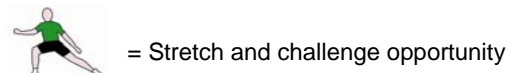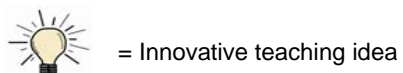

= ICT Opportunity
This icon is used to illustrate when an activity could be taught using ICT facilities.

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	Topic	3.3.1: The Systems Cycle

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a) Stages of the systems cycle and how the stages relate to ICT systems	• Presentation of the basic stages of the life cycle • Group brainstorming session about the origins of need for a new system and cost benefit analysis • Discuss the difference between analysis and design stages and the fact that design is the creative part of the process whilst analysis is the problem solving part of the process • Use a diagram to show the waterfall model. Ask students to complete a 'fill in the gaps description' of each stage of the life cycle	• Use the following as an on-line resource http://www.teachict.com/as_a2/topics/system_life_cycle/LifeCycle.ppt • A level ICT P M Heathcote Chapter 38 The information systems life cycle	• The focus of the lesson should be to present the systems cycle as an overview, clearly teasing out issues such as iteration and the difference between analysis of the current system and design of the new system. The detailed methods of investigation in the analysis phase follows in the next lesson
b) Different approaches an analyst might use when investigating a new system: questionnaires, interviews, meetings, document analysis, observation	• Look at the different methods of investigation and consider the advantages and disadvantages of using each method for different scenarios e.g. new order processing system, installing a new registration system in a school • Student exercise – 1) compare the use of document analysis and interviews for a video lending library • 2) Write a questionnaire targeted at the manager of the video lending library	• Use the following as an on-line resource: http://www.jiscinfonet.ac.uk/InfoKits/creating-an-mle/understanding-your-organisation/finding-and-using-information • For Questionnaire design: http://www.tardis.ed.ac.uk/~kate/qmcweb/qcont.htm http://www.statpac.com/surveys/questionnaire-design.htm • For an overview/introduction see Ch 19: • ICT for GCSE. D. Walmsley et al, Hodder and Stoughton	• 4 methods should be clearly presented and compared. It is important to look at what makes a good interview, questionnaire etc

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	Topic	3.3.1: The Systems Cycle

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
c) Software development methodologies: prototyping and Rapid Application Development	• Explanation of prototyping as a means of developing software, including the difference between rapid prototyping (throwaway) and evolutionary prototyping • Discussion as a group about the possible benefits of RAD, including issues such as user involvement • Student exercise - to write up the features to be built into a prototype interface for a video lending library	• Use as detailed resource: http://csweb.cs.bgsu.edu/maner/domains/RAD.htm • Sample product: http://www.cirrussoftware.com/SiteManager/userFiles/downloads/1_RADmethodology.PDF • A level ICT P M Heathcote: P216	• User involvement is a key issue. Also there should be an emphasis on time saved using RAD
d) The purpose of test data and the importance of testing and test plans	• Start by answering the question 'why test?' Ask students to come up with ideas/answers. Summarise by explaining the purpose of test data and why it is important to test – discuss GIGO	• Introduction: http://en.wikipedia.org/wiki/Software_testing http://www.teach-ict.com/as_a2/topics/data_info_know/datainfo/testing_data.htm • A level ICT P M Heathcote: P188-190	• The difference between a test strategy and a detailed test plan should be clear. Students should be aware that test plans should be constructed as the program is written and for system testing that the test strategy should be clear as the system is designed
	• Present a layout for a typical test plan • Ask students to complete with test data for testing input of member data for the video lending library		

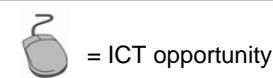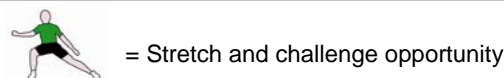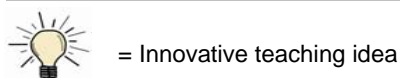= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	**Topic**	3.3.1: The Systems Cycle

Topic outline	**Suggested teaching and homework activities**	**Suggested resources**	**Points to note**
e) The contents of the requirements specification, the design specification and the system specification, distinguishing between them	• Review systems life cycle and establish the difference between the analysis phase and design phase. Explain the purpose of the requirements spec and the importance of stakeholders including users • Design Specification and differences from requirements specification • Split group into two teams to prepare a list of the content of each type of spec using resources suggested. Bring two teams together to present their list and discuss to clarify	• Introduction: http://en.wikipedia.org/wiki/Requirements_analysis#Software_requirements_specification • Open process Framework: http://www.opfro.org/index.html?Components/WorkProducts/RequirementsSet/SystemRequirementsSpecification/SystemRequirementsSpecification.html~Contents • Sample design spec for database: http://csci.csusb.edu/dick/cs372/project5.html • A level ICT P M Heathcote: P213-4 A level ICT P M Heathcote	
f) Roles and responsibilities of the project team: project manager, systems analyst, systems designer, programmer and tester	• Discuss and introduce Project Management. Put group into pairs to prepare a PowerPoint presentation covering different roles and responsibilities. Teaching group to view each other's work	• Introduction to Project planning : http://www.teach-ict.com/as_a2/topics/project_management/project%20planning.ppt • A level ICT P M Heathcote: Chapter 50	
g) Tools for Project planning: Critical Path Analysis (CPA) and Gantt Charts	• Describe and show examples of Gantt Charts, PERT and CPA • Students prepare a Gantt chart for the major project	http://www.teachict.com/contributors/mark_bebbington/projectmanagement.ppt http://www.netmba.com/operations/project/pert/ http://www.mindtools.com/critpath.html	• This links well with the project work and will focus the students on planning and meeting mini deadlines for their own coursework

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	Topic	3.3.1: The Systems Cycle

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
h) Entity relationship diagrams. State transition diagrams, data flow diagrams and flowcharts and their suitability for given applications Students to draw up criteria for comparison (some may be provided initially) and then compare STD,DFD,FC	• Talk about the difference between data modelling (ERD) and process modelling (DFD) then look at each and their use in describing database applications. Look at State transition diagrams and their suitability for use in OOP applications finally flowcharts and how they are used by programmers and systems analyst/designers for a variety of applications	• RDBMS and ERA diagrams: http://www.teach-ict.com/contributors/fat_max/dbctd.ppt • Data Flow diagrams: http://en.wikipedia.org/wiki/Data_flow_diagram http://www.getahead-direct.com/gwbadfd.htm • State transition diagrams: http://atlas.kennesaw.edu/~dbraun/csis4650/A&D/UML_tutorial/state.htm http://www.csc.calpoly.edu/~dbutler/tutorials/winter96/rose/node10.html • Flowcharts: http://en.wikipedia.org/wiki/Flowchart http://deming.eng.clemson.edu/pub/tutorials/qctools/flowm.htm	• Students should be clear about the differences between data and process modelling before looking at examples of each

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GCE ICT

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	Topic	3.3.2: Designing Computer-based information systems

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a) Batch, Interactive and Real time processing systems: discuss in terms of processing methods, response time and user interface requirements	• Discuss batch vs real time operating systems in terms of response time. Explain difference between real time and interactive applications using examples. Homework: Find one new example of the three types of system and write a paragraph about each to distinguish characteristics	• Background reading real time: http://media.wiley.com/product_data/excerpt/90/08194178/0819417890-2.pdf • OS Batch and real time and other OS see below: http://www.northern.ac.uk/ncmaterials/computing%20science/hardware/Operating%20Systems%20Chap%207.htm • A level ICT P M Heathcote: Chapter 24	• Characteristics of all three systems should be distinct and clear in terms of turnaround time, transaction volume, etc • Application examples are essential e.g. control systems essentially real time, payroll and cheque processing generally batch
b) Identify the major characteristics of different operating systems: single user, multi-user, multi-tasking, interactive, real time, batch processing and distributed processing systems	• Discuss the characteristics of the different OS. Pair up students: get them to prepare a list of advantages for each. Create a comparison table as a whole class from the lists	http://www.northern.ac.uk/ncmaterials/computing%20science/hardware/Operating%20Systems%20Chap%207.htm	
c) the use of colour, layout, quantity of information on screen, size of font, complexity of language and type of controls, when designing the human-computer interface	• Present the main issues to consider when designing HCI. Use Microsoft s/w approach as example • In class students design an HCI of 2 or 3 screens for booking a hotel room. Finish for Homework. To be presented and critiqued by whole class next lesson	http://www.teach-ict.com/as_a2/topics/human_computer_interface/HumanComputerInterface.sw http://www.teach-ict.com/contributors/fat_max/HCI.ppt http://www.teach-ict.com/as_a2/topics/human_computer_interface/well_designed_interfaces.ppt	• Students will require a specification for the interface

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	**Topic**	3.3.2: Designing Computer-based information systems

Topic outline	**Suggested teaching and homework activities**	**Suggested resources**	**Points to note**
d) different methods of dialogue that allow interaction between computer and person, person and computer, and computer and computer	• Review HCI screen design and present other types of HCI dialogue: forms, CLI, Natural Lang, Menu Interfaces. Discuss the use of protocols for supporting Comp-Comp dialogue. Set up a role play between pairs of students. Ask them to behave or act as though they were a printer and a computer, expressing dialogue verbally	• See some links above • Use this resource for student activities in the lesson http://www.teach-ict.com/as_a2/topics/human_computer_interface/well_designed_interfaces.ppt http://www.techtionary.com/index_in.html (select H and HTTP) - there are others	
e) The concept and implication of good methods of human-device communications, particularly human-computer interfaces (HCI) using command line interfaces, menus/submenus, Graphical User Interfaces (GUIs), natural languages (including speech input-output) and forms	• Presentation of the different forms of interface, followed by discussion of situations when each type of interface is likely to be used	http://www.teach-ict.com/contributors/mark_bebbington/Human_Computer_Interface.ppt • Information Technology – An Introduction: P Zorkoczy & N Heap. Chapter 21 http://www.reviseict.co.uk/as/index.shtml	• Students should be able to discuss the advantages and disadvantages of each HCI type

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	16 hours	Topic	3.3.2: Designing Computer-based information systems

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
f) Explain how a potential user's perception, attention, memory and learning can be taken into account when designing an interface	• Present theory and then discuss • Set sample examination question for homework	• Information Technology – An Introduction: P Zorkoczy & N Heap. Chapter 20 http://www.reviseict.co.uk/as/index.shtml	• This is a difficult concept for some. Use acronyms and memory hooks to help the student remember the basic concepts and then tease out their understanding during discussion and with the homework question
g) Mental models and how they can be applied to the design of a user interface	• Discuss – what is a mental model? Debate what might go wrong with a system which did not match a user's mental model. Use everyday examples to get the idea – traffic lights or screws (clockwise to screw in anti to unscrew etc or on/off switches). If our mental model is not matched we get confused	• Information Technology – An Introduction: P Zorkoczy & N Heap. Chapter 20 http://www.reviseict.co.uk/as/index.shtml http://www.teach-ict.com/as_a2/topics/human_computer_interface/A2_ICT_HCI.doc	• Another difficult concept. Try and get the students to think about how they view the world and then how they view interfaces that don't conform to the widely accepted GUI
h) The importance of designing a system model which matches closely the user's mental model	• Set sample exam question for homework		
i) The user interface design tool known as the Model Human Processor, developed by Card, Moran and Newell, and its application	• Use second resource as a PowerPoint presentation. Go through a past exam question and set another one for homework	http://tip.psychology.org/card.html overview http://groups.csail.mit.edu/graphics/classes/6.893/F03/lectures/L3.pdf -presentation http://www.learning-theories.com/goms-model-card-moran-and-newell.html	• Practice answering past exam questions to reinforce this concept

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	22 hours	Topic	3.3.3: Networks and Communications

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a) The characteristics of a local area network (LAN), a wide area network (WAN) and a virtual network b) The characteristics and purpose of intranets, the internet and extranets	• Review network topologies and discuss comparatively the characteristics of LANs and WANs. Split group in half and get one half to do a presentation on LANs and Extranets and the other half to do a presentation on WANs and Internet. Summarise session by looking how the Internet facilitates Extranet and WANs	http://www.teach-ict.com/as_a2/topics/networks/pages/chap1.htm http://fcit.coedu.usf.edu/network/chap5/chap5.htm http://www.teach-ict.com/as_a2/topics/networks/pages/common.html http://www.mariosalexandrou.com/definition/intranet.asp http://www.learnthat.com/define/view.asp?id=316 http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci212089,00.html • A Level ICT P Heathcote: Chapter 29.	• Focus on the following criteria: • Geographical area, type of communications link between computers, possible topologies for LAN and WAN • Intranet as it differs from an Extranet gateway • Difference between WWW and Internet
c) Client-server and peer-to-peer networks giving advantages and disadvantages of each Define and look at the importance of bandwidth	• Introduce the difference between client – server and peer-to-peer. Students to research and compile a list of advantages and disadvantages of each. Discuss and compile a common list for the whole group • Look at bandwidth definition and then discuss why bandwidth is important. Homework: Write a summary of different methods (56K Modem, ADSL connection, ISDN connection) of connecting to the Internet and how their bandwidth affects download speeds for a user	http://fcit.coedu.usf.edu/network/chap6/chap6.htm • A Level ICT P Heathcote: Chapter 29. http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci212769,00.html http://www.teach-ict.com/as_a2/topics/networks/network%20general/networks.swf http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci211634,00.html	• This session should also include a basic introduction to bandwidth and establish students' understanding in preparation for the next class

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	22 hours	**Topic**	3.3.3: Networks and Communications

Topic outline	**Suggested teaching and homework activities**	**Suggested resources**	**Points to note**
d) The importance of bandwidth when transmitting data and how different types of communication media (cables, wireless, optical) govern the bandwidth available (knowledge of examples of different communication media is expected)	• Introduce the different media available and then ask students to explore the web links. In pairs prepare a comparison table for the three different communications media. Homework: Write a critique of wireless networking	http://fcit.usf.edu/network/chap4/chap4.htm http://www.arcelect.com/fibercable.htm http://www.howstuffworks.com/fiber-optic.htm http://computer.howstuffworks.com/wireless-network.htm • Information Technology – An Introduction. Zorkoczy and Heap Ch 10	• Students should base their comparison on prepared criteria cost, bandwidth, security
e) Compare the role of the following network components: switches, hubs, wireless access points, network interface cards, wireless network interface cards, routers, repeaters, bridges and servers (file, applications, mail, proxy, print, backup) and identify where their use would be appropriate	• Introduction to the different network components using a presentation • Students given a handout to complete consisting of a table with each component and a corresponding set of columns headed: definition, role, use • They should then sample the web links and research the Internet further	http://fcit.coedu.usf.edu/network/chap3/chap3.htm http://www.teach-ict.com/as_a2/topics/networks/networkswf/NWB_SIM.swf http://www.teach-ict.com/as_a2/topics/networks/network%20components/networkcomponents2.ppt http://www.teach-ict.com/as_a2/topics/networks/network%20components/networkcomponents/index.htm	• Students should be familiar with all components before starting the exercise. It may be sensible to get them to do some prior reading and prep before the lesson. Table to be finished for homework. Handed in for marking and corrections

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	22 hours	**Topic**	3.3.3: Networks and Communications

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
f) Optical communication methods (infrared, fibre optic, laser), their advantages and disadvantages and typical applications	• Present the different types of optical communication, building on (d) above • Discuss applications and explore web links. Then review looking at advantages and disadvantages	http://fcit.coedu.usf.edu/network/chap4/chap4.htm http://www.howstuffworks.com/mouse2.htm http://electronics.howstuffworks.com/remote-control1.htm http://electronics.howstuffworks.com/dvd10.htm	
g) Wireless communication methods (Bluetooth®, radio) their advantages, disadvantages and typical applications	• Present the different types of wireless communication, building on (d) above • Discuss applications and explore web links. Then review looking at advantages and disadvantages	http://fcit.coedu.usf.edu/network/chap4/chap4.htm http://www.howstuffworks.com/bluetooth.htm http://www.howstuffworks.com/wireless-network1.htm	
h) Facilities of the following communication applications: fax, email, bulletin (discussion) boards, tele/video conferencing and Internet Relay Chat (IRC) and compare their use for a given application	• Present basic features of fax, email, BBoards, tele/video conferencing and IRC • Refer students to the web links and text book. In class and to finish for prep, set an essay to compare their use. Students should give examples of applications they have found during their research	• Information Technology – An Introduction. Zorkoczy and Heap Ch 11 • A Level ICT P Heathcote: Chapter 6 http://www.mirc.com/irc.html http://en.wikipedia.org/wiki/Video_conferencing	

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	22 hours	Topic	3.3.3: Networks and Communications

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
i) Different types of broadband connection and give suitable situations where the use of each would be appropriate: Asymmetric Digital subscriber line (ADSL), cable, wireless, leased line, satellite	• Review (d)-(g) and discuss as a group how each broadband connection would be suitable in different situations: home, small business, education, banks etc	http://www.wkmn.com/newsite/wireless.html http://www.reviseict.co.uk/as/index.shtml	• This is an opportunity to consolidate what has been learned so far
j) How a mobile phone network operates (cellular and satellite) and the advantages and disadvantages of cellular and satellite mobile phone systems and their use	• Present 'how a mobile phone works - how the two types of phone operate in the environment – masts – satellites etc.' Using web links students prepare for question answer session round robin style	http://en.wikipedia.org/wiki/Cellular_network http://www.howstuffworks.com/cell-phone7.htm	

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	22 hours	Topic	3.3.3: Networks and Communications

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
k) How satellite communications systems are used and work in global positioning, weather, data transfer systems and television, and the advantages and disadvantages of using satellites for these applications l) The implications of being able to communicate from anywhere in the world using mobile technology	• Students research and prepare a PowerPoint presentation on this topic • Students to practice past exam questions on this topic	http://www.howstuffworks.com/cell-phone7.htm http://www.navigadget.com/index.php/2006/08/23/sg-2520-satellite-mobile-phone/	
m) The importance of standards for communicating between devices and explain how protocols are used to enable this communication (candidates will not be expected to have detailed knowledge of specific protocols)	• Discuss standards generally then look at protocols and their use for communicating devices • Students to practice past exam questions on this topic • Homework: to work past exam questions on this module	http://www.teach-ict.com/as_a2/topics/protocols_standards/14.10%20PORTABILITY.dot http://www.javvin.com/protocols.html	

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	18 hours	Topic	3.3.4: Applications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a)The use of telecommunication and information technology in telephone systems, banking, production control, global positioning systems, navigation and weather forecasting	• Present overview and then get students to research systems for themselves either in pairs or individually. Each to prepare a summary of one of the application's characteristics as a desk top published flyer	http://www.teach-ict.com/as_a2/topics/telephone_systems/telephone%20systems.htm http://openlearn.open.ac.uk/mod/resource/view.php?id=102002 http://antonine-education.co.uk/ICT_AS/ICT_Module_1/Topic_2/topic_2.htm http://www.teach-ict.com/gcse/theory/banking/gcse%20banking/index.htm http://www.teach-ict.com/as_a2/topics/satellites/gps/gps_and_the_future.htm http://en.wikipedia.org/wiki/Weather_forecasting http://www.teach-ict.com/as_a2/topics/satellites/satcomm.htm	• There is a lot to cover with this so sharing knowledge over this session and the next is vital. It is also essential to emphasize to students that they must frequently review their systems so that they are familiar with them

= Innovative teaching idea

= Stretch and challenge opportunity

= ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	18 hours	Topic	3.3.4: Applications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
b) The use of software based training methods	• Distribute and discuss flyers from the last lesson • Look at CBT/CAL and explain the difference. Expand discussions with group to talk about e-learning in schools and colleges. Focus on CBT and get students to look for sample CBT systems given the characteristics	http://en.wikipedia.org/wiki/E-learning http://www.e-learningcentre.co.uk/eclipse/Resources/whatise.htm • Chapter 5 A level ICT P Heathcote	• Note the specification asks for CBT but looking at e-learning and CAL generally sets the scene
c) The limitations of using ICT in society today and how advances in technology may overcome some of those limitations	• Discuss the implications of ICT in society and present main technological developments that are currently underway to improve the use of ICT in society	http://www.teach-ict.com/as_a2/topics/ict_caring_society/caring_society.htm http://www.teach-ict.com/as_a2/topics/disabled_and_ict/ict_disibility.htm http://www.teach-ict.com/as_a2/topics/social_impact_of_ict/social_impact_ict.htm http://www.teach-ict.com/as_a2/topics/implications_of_ict/implications.htm http://www.teach-ict.com/as_a2/topics/new_developments/new_developments.htm	• There are lots of relevant and up-to-date articles which could be searched for to support this topic e.g. spam, identity fraud, un-policed Internet etc

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	18 hours	Topic	3.3.4: Applications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
d) The use of networks of computers at work and at home e) How databases may be stored in more than one physical location and how distribution may be carried out using different approaches: partitioned between sites (vertical and horizontal), entire databases duplicated at each site, central database with remote local indexes	• Present a scenario of three people using standalone computers at home and then what would happen if they were networked. Talk about the Internet and connecting to work based servers. Discuss teleworking. Progress discussion to talk about offices having groups of computers but needing to communicate within the office and with computers at other offices. If the group is large enough it may be possible to role play by sending data on paper from office to office and person to person within an office. • Cover basic theory of distributed databases as a presentation. Utilise web sites for reinforcement	• Chapter 2,3,4, 7, 58 A level ICT P Heathcote http://www.teach-ict.com/as_a2/topics/databases/Distributed%20Databases.doc http://en.wikipedia.org/wiki/Distributed_database http://learningat.ke7.org.uk/itweb/year13/distproc1.htm Q5 from teach-ict: http://www.teach-ict.com/as_a2/exams/2515_exam_questions/applications_of_ict/dq5.htm	• Many students may already have a home network so it is good start from their base knowledge and expand
f) The use of different types of distributed database systems g) Security issues of distributed databases: interception of data, physical access to data, consistency and integrity of data and describe methods of overcoming these issues	• Present security issues of DDBs • Look at typical applications and discuss why security is so important. Use 2nd web link for detailed notes	http://www.cs.nsu.edu/research/techdocs/TR005_Carolyn_Mitchell.pdf http://www.redbooks.ibm.com/pubs/html/as400/v4r5/ic2924/index.htm?info/db2/rbal1mst20.htm Q3 teach-ict :http://www.teach-ict.com/as_a2/exams/2515_exam_questions/applications_of_ict/dq3.htm	• Often a difficult concept for students, so link back carefully to previous week's work

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	18 hours	Topic	3.3.4: Applications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
h) Definition of an expert system and describe its components and applications	• Present basic characteristics of an expert system and quote some examples. Students to explore some of the expert systems examples on the teach-ict website	• Chapter 41 A level ICT P Heathcote http://www.teach-ict.com/as_a2/topics/rule_based_systems/rule_based_systems.htm	• It is important to distinguish the difference between the way and MIS operates and the way an expert system operates
i) How the following ICT tools can be used to assist decision making: Management Information Systems (MIS) and expert systems	• Split the group into 2 and get one group to explore MIS in decision making and one group to explore decision making using expert systems. Group to 'sell' their approach to each other next lesson. Homework to finish preparing a presentation using PowerPoint		
j) the range of services offered by digital television networks and the impact of these services on individuals, television companies and broadcasters	• Presentations from last lesson • Short discussion about the student's experiences and knowledge of digital television networks. Summarise basic characteristics of digital TV networks and then discuss the impact these services have on individual, TV companies and broadcasters	http://www.teach-ict.com/as_a2/topics/cable/cable.htm Q5: http://www.teach-ict.com/as_a2/exams/2515_exam_questions/communications_and_networksys/bq5.htm	• A good sound base knowledge may already be present amongst students

= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	18 hours	Topic	3.3.4: Applications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
k) The internal resources of a system: human, technological and accommodation l) The importance of ensuring that information is exchanged accurately and in a timely manner within an organisation and describe how this is achieved	• Use PowerPoint presentation to introduce the topic • Discuss how important internal resources are in supporting information exchange • Look at the mini website about the role of information and stress the importance of accuracy and timeliness of info. Get students to do exercises within the website	http://www.teach-ict.com/as_a2/topics/organisations/internal_resources/internal%20resources.ppt http://www.teach-ict.com/as_a2/topics/role_of_information/miniweb_role_of_info/index.htm	• Should build on previous knowledge covered at AS level. It should be noted that this is now an overall system such as a company or factory and that we are talking more "business studies" than "computing" at this point • Common sense examples are needed for the exchange of information as well as book definitions
m) The characteristics of the following systems: personnel, finance and stock control	• Outline the characteristics of these systems then students explore web links and answer prepared questions about each of the three areas	http://www.teach-ict.com/gcse/theory/supermarkets/supermarkets%20and%20ict/index.htm http://www.teach-ict.com/gcse/theory/payroll/miniweb/index.htm http://wikitextbook.co.uk/index.php/The_use_of_ICT http://openlearn.open.ac.uk/mod/resource/view.php?id=102002	• Should build on previous knowledge

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	10 hours	Topic	3.3.5: Implementing Computer-based Information Systems

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a) Involvement of the client when a custom-written computer-based information system is to be produced, from the initial meeting with the client to the installation of the system b) Discuss the implications of selecting, implementing and supporting the installation of custom-written and off-the-shelf solutions	• Review off-the-shelf vs custom written software. Discuss the benefits and drawbacks of each. Review stages of the systems cycle where users are involved and how • Students split into 2 groups to do Internet searches to consider the implications of supporting customer off the shelf when selecting and implementing these solutions. This is to be to finish for homework and presented next session	http://www.teach-ict.com/gcse/software/software/miniweb/bespoke11.htm http://www.thekjs.essex.sch.uk/yates/it04.htm	• Emphasize the problems with lack of user involvement. Most of a 1 hour lesson will go and leave little time for starting the homework task. However this is a good opportunity to get students thinking about user participation covered in more detail in 3.3.6
c) Explain how the expertise of staff, costs, benefits and current systems affect decisions about upgrading or installing software and hardware	• Short ten min presentations from last session. Review and discuss • Present basic theory on upgrading from Heathcote. Homework sample exam question	• Chapter 52 and 54 A level ICT P Heathcote	

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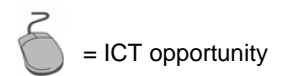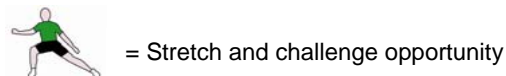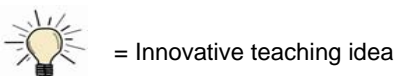 = Stretch and challenge opportunity

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GCE ICT

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	10 hours	**Topic**	3.3.5: Implementing Computer-based Information Systems

Topic outline	**Suggested teaching and homework activities**	**Suggested resources**	**Points to note**
d) Describe a range of methods for installing a new computer-based information system: parallel, phased, direct, pilot e) Discuss the choice of a particular installation method or methods for a range of applications	• Present basic theory/review GCSE theory • Using Heathcote scenarios within Ch38 discuss as a group suitable conversion methods. Homework past exam questions and pre-reading about the role of reviews	• Chapter 38 A level ICT P Heathcote http://www.teach-ict.com/as_a2/topics/system_life_cycle/slc/implementation.htm http://www.teach-ict.com/gcse/theory/syslifecycle/miniweb/implementation7.htm	• Students should be encouraged to consider a combination of methods where appropriate
f) Explain the role of reviews during the life of a computer-based information system, describing how reviews may be planned for and carried out effectively	• Class discussion to consider planning for reviews	• Chapter 38 A level ICT P Heathcote http://www.teach-ict.com/contributors/mark_bebbington/Implementing_CBIS.ppt http://www.teach-ict.com/as_a2/topics/system_life_cycle/Top%20Cuts.doc	• This lesson links closely with the last lesson
g) Perfective, adaptive and corrective maintenance and h) Explain the need for perfective, adaptive and corrective maintenance during the life of a computer-based information system	• Present theoretical concepts • Systems cycle review teasing out salient points about prototyping, user involvement, reviews and maintenance. Discussion about the importance of maintenance and regular reviews	• Chapter 38 A level ICT P Heathcote http://www.massworkforce.org/ResourceCenter/SteeringCommMinutes/2006/Word/June06A.doc http://www.teach-ict.com/as_a2/topics/system_life_cycle/information_systems_lifecycle.ppt	

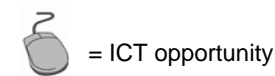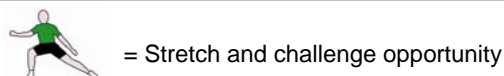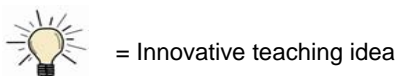= Innovative teaching idea   = Stretch and challenge opportunity   = ICT opportunity

GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	12 hours	Topic	3.3.6: Implications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
a) Discuss the impact of external change on an organisation, individuals within the organisation and on the systems in use	• Introduce organisational boundaries –internal and external • Present the external influences on organisations • Discuss as a group the impact of changes that occur as a result of external influences	http://www.teach-ict.com/as_a2/topics/organisations/organisational_boundaries/boundaries_of_organisations.ppt http://www.teach-ict.com/as_a2/topics/organisations/organisational_relationship_enviro/relationship_to_environment.ppt Handout: http://www.teach-ict.com/as_a2/topics/management_of_change/13.5Themanagement%20of%20change.dot	• Draw on students knowledge of school internal boundaries (e.g. departments) and external influences (e.g. Government legislation, Teacher training etc)
b) Describe change management and factors which must be considered (staff capability, staff views, systems, equipment and accommodation) when managing change	• Study questions and answers given in pairs • Consider the case studies Ch 44 Heathcote	Handout: http://www.teach-ict.com/as_a2/topics/management_of_change/13.5Themanagement%20of%20change.dot http://en.wikipedia.org/wiki/Change_management • Chapter 44 A level ICT Heathcote	• Again draw on student's knowledge and experiences of change within school or in their life experiences eg moving house
c) Discuss the importance of consultation, participation and communication when managing change	• Discuss and consider the ETHICS approach (Enid Mumford). Also discuss the importance of training as an additional factor • Students to study and produce a poster/flyer 'selling' the ETHICS approach	http://www.businessballs.com/changemanagement.htm http://www.enid.u-net.com/C1book1.htm • Chapter 44, 48 and 49 A level ICT Heathcote	• At the heart of the ETHICS approach is Consultation, participation and communication. Ensure that training is added to the list

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	12 hours	Topic	3.3.6: Implications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
d) Discuss ethics relating to ICT with reference to codes of conduct, for example, the British Computer Society (BCS) code of conduct and Association for Computing Machinery (ACM) Code of Ethics and Professional Conduct e) Describe the purpose and activities of professional bodies, for example, BCS f) Explain the advantages and disadvantages of belonging to a professional body	• Present ethical issues related to ICT and the codes of conduct for the BCS. Describe typical activities and then look at their website • Discuss as a group the need for such professional bodies and tease out why it is advantageous for professionals to belong to for example the BCS • Students to explore BCS and ACM sites and write up the comparative benefits and drawbacks of belonging to each for homework	http://www.teach-ict.com/as_a2/topics/ethics_and_responsibility/TenCommandments.ppt http://www.bcs.org/ http://www.acm.org/	• The web sites for professional bodies give a good working knowledge of the aims and services provided to member professionals • Students need to understand what is meant by the word "ethics" and also not to confuse with the process "ETHICS" from the previous lesson
g) Discuss the need to keep data confidential and explain how this can be achieved	• Review the data protection act and discuss the use of passwords, firewalls and encryption • Discuss antivirus software and review and compare products	http://www.teach-ict.com/as_a2/topics/data_protection_act/data_protection/index.htm • Chapter 59 A level ICT Heathcote http://www.buildings.com/Articles/detail.asp?ArticleID=1740	

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GCE ICT: H517. G063 ICT Systems, Applications and Implications

Suggested teaching time	12 hours	Topic	3.3.6: Implications of ICT

Topic outline	Suggested teaching and homework activities	Suggested resources	Points to note
h) Discuss how encryption, authorisation, authentication, virus checking, virus protection and physical security can be used to protect data	• Student exercise to research up to date methods of physical protection for computer data	http://www.iec.org/online/tutorials/int_sec/topic03.html http://www.iec.org/online/tutorials/int_sec/topic01.html http://www.iec.org/online/tutorials/int_sec/topic02.html http://www.pcworld.com/article/id,124475-page,1/article.html http://antivirus.trustix.com/comparisons.html	
i) Discuss hardware and software developments which are changing, or might change the way we live. Examples might include advances in treating injuries or disease, leisure activities, the environment, the home, education and freedom of speech and movement	• Introduce current hardware and software developments and some applications to start students thinking. Share ideas in discussion. It is important to discuss the use of new technology • Students research the web links and news articles (a good idea to keep a few from current week's press to give ideas and for reference) and expand their knowledge. Each student to prepare an essay on how technology could be used – Give a scenario for example: A man gets lost climbing a mountain in the mist. - how can modern tech. help? Virtual reality run-throughs so that he knows the terrain, portable GPS, satellite phone, waterproof/intelligent materials for clothing, personal organiser to remind him what to take. Tracker fitted to hiking boot. Finish for homework	http://www.pharmabiz.com/article/detnews.asp?articleid=22231&sectionid=46 http://www.globalfuture.com/gwu-top10-00.htm http://www.popularmechanics.com/blogs/technology_news/4216434.html http://www.iol.co.za/index.php?set_id=1&click_id=31&art_id=qw1098254161998B251 http://smartrobots.com/network.php http://www.anderson-smart-homes.co.uk/smart.htm?gclid=CIKX24STx4wCFQgvlAod7jVtJQ http://www.aaai.org/AITopics/html/tutor.html http://www.learningcircuits.org/2000/feb2000/ong.htm http://egweb.mines.edu/ibdms/	• Students enjoy looking up recent developments. Try to encourage them to do this throughout the course so that they are well read before this lesson and it will prove to be a dynamic session sharing ideas and knowledge by this stage

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ICT Sample Lesson Plan

GCE ICT H517. G063 ICT Systems, Applications and Implications

Process modelling

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be one hour.

3.3.1 (h) describe, interpret and create entity relationship diagrams, state transition diagrams, data flow diagrams and flowcharts, and for each explain its suitability for use in a given application;

Learning Objectives for the lesson

Objective 1	Students understand that there are a range of methods to represent a process.
Objective 2	Students are able to describe entity relationship diagrams, state transition diagrams, data flow diagrams and flowcharts.
Objective 3	Students are able to explain the suitability of each in a given application.

Recap of previous experience and prior knowledge

- Review graphical representation methods used on the course thus far.

- Discuss why each example was appropriate for that scenario.

Content

Time	Content
5 minutes	Warm up activity to start students thinking about communicating graphically.
5 minutes	Introduce the concept of symbols to represent a process. Using a word game, identify/revise the four methods of representation to be studied.
45	Using a resources such as http://www.teachict.com/contributors/fat_max/dbctd.ppt

Time	Content
minutes	students investigate how entities relate to each other and the levels of relationship that can be described graphically, undertaking the worked example for an entity relationship diagram. Using http://atlas.kennesaw.edu/~dbraun/csis4650/A&D/UML_tutorial/state.htm and http://www.csc.calpoly.edu/~dbutler/tutorials/winter96/rose/node10.html students identify commonalities of symbols to represent the behaviour of a system in a state transition diagram. Students research other examples of use, using a search such as http://images.google.co.uk/images?q=state+transition+diagrams&hl=en&um=1&ie=UTF-8&sa=X&oi=images&ct=title.
	Using a set of pre-drawn symbols, students are then asked to illustrate how data moves through a system in a given situation, for example during the examination process, from a student taking the examination to receiving notification of a grade. The BCS Glossary of ICT and Computing Terms, part C2 gives a widely used set of symbols used in dataflow diagrams.
	Symbols similar to those at http://en.wikipedia.org/wiki/Flowchart can then be used by students in pairs or small groups to recreate the operations involved in a process or system, using a scenario of choice. The pre-prepared symbols could be laminated for students who arrange them in the correct way ready for evaluation.

Consolidation

Time	Content
5 minutes	Teacher summarises with the important points to note and sets homework exercise to cover the topic and extend ideas. These could be past examination questions covering a similar learning outcome or the creation of a mind map incorporating the 4 main models and identifying characteristics of them, indicating an appropriate use of each.

ICT Sample Lesson Plan

GCE ICT H517. G063 ICT Systems, Applications and Implications

Optical communications

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be one hour.

3.3.3 (f) describe optical communication methods (infrared, fibre optic, laser), their advantages and disadvantages and typical applications;

Learning Objectives for the lesson

Objective 1	Students understand that there are a range of optical media used by communicating devices.
Objective 2	Students are able to describe infrared, optical fibre and laser methods.
Objective 3	Students are able identify typical applications and devices which use optical communication methods.
Objective 4	Students are able to discuss the advantages and disadvantages of different optical communication methods.

Recap of previous experience and prior knowledge

- Review and discuss network cabling and discuss transmission speeds offered by traditional copper based cables.

- Remind students that devices need to be able to communicate via cable or other means.

Content

Time	Content
5 minutes	Warm up activity to start students thinking about communicating devices and

Time	Content
	media
Time	**Content**
10 minutes	Introduce the concept of optical media. Using the site http://fcit.coedu.usf.edu/network/chap4/chap4.htm present optical fibre media and wireless LANs using infrared and laser.
5 minutes	Students brainstorm (guided by the teacher) other applications where they may find laser/infrared used such as in optical mice, remote control devices
10 minutes	Students in pairs or small groups study the web links http://electronics.howstuffworks.com/remote-control1.htm http://electronics.howstuffworks.com/fiber-optic.htm http://space.com/spacenews/businessmonday_041115.html They should then research other sites about optical communications and look for diagrams about the way light signals travel.
15 minutes	Each pair or small group contributes their findings, teacher to verify accuracy of findings as the class compiles a mind map containing each method. Ideas to cover may include; Method (infrared, fibre optic, laser), Application, How light signal travels, Advantages, Disadvantages.

Consolidation

Time	Content
10 minutes	Class discussion about the relative advantages and disadvantages of different optical communications. This could take the form of an interactive quiz such as http://www.teach-ict.com/as_a2/topics/optical%20communication/optiquiz.htm
5 minutes	Teacher summarises with the important points to note and sets homework exercise to cover the topic and extend ideas. These could be past examination questions covering a similar learning outcome or the reading of an associated article such as http://news.bbc.co.uk/1/hi/sci/tech/4671788.stm Alternatively a comparison table of optical communications and copper cabling could be formed. Criteria could include distance, capacity, speed, interference, corrosion, security and cost.

ICT Sample Lesson Plan

GCE ICT H517. G063 ICT Systems, Applications and Implications

Distributed databases

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be one hour.

3.3.4 (e)   explain how databases may be stored in more than one physical location and how distribution may be carried out using different approaches: partitioned between sites (vertical and horizontal), entire databases duplicated at each site, central database with remote local indexes;

   (f)   discuss the use of different types of distributed database systems;

   (g)   explain security issues of distributed databases: interception of data, physical access to data, consistency and integrity of data and describe methods of overcoming these issues;

Learning Objectives for the lesson

Objective 1	Students understand that databases may be stored in more than one physical location.
Objective 2	Students understand different distribution methods for databases.
Objective 3	Students are able to explain the benefits and drawbacks of using different types of distribution methods
Objective 4	Students are able to explain security issues of distributed databases such as interception of data, physical access, consistency and integrity of data.

Recap of previous experience and prior knowledge

- Review databases and check understanding with respect to consistency, integrity of data and removal of data duplication.

- Review WANs and scenarios where several offices are located at distance.

Content

Time	Content
5 minutes	Warm up activity to start students thinking about databases.
15 minutes	Introduce the concept of distributing a database. Explain that there are various options for distributing data; by partitioning data to relevant locations over a WAN, duplication at each site and a centralised database with remote local indexes. As discussion progresses, get students to draw themselves a diagrammatic version of each option for later checking. Use Chapter 58, A level ICT P Heathcote (3rd edition) as textual reference.
10 minutes	Students review http://en.wikipedia.org/wiki/Distributed_database http://learningat.ke7.org.uk/itweb/year13/distproc1.htm whilst teacher checks diagrams drawn up by students
10 minutes	Students pair up or split into small groups to generate their own ideas of the security issues associated with distributed databases. Read http://www.cs.nsu.edu/research/techdocs/TR005_Carolyn_Mitchell.pdf for reference.

Consolidation

Time	Content
15 minutes	A script is produced for publishing as a podcast. Each group or pair is assigned an aspect of distributed databases for submission as a short definition. As this will be used for revision, the teacher will assess the accuracy of the definitions and terms. Publishing could be achieved by using a free software resource such as http://audacity.sourceforge.net/
5 minutes	Teacher summarises with the important points to note and sets homework questions to cover the topic and extend ideas. These could be past examination questions covering a similar learning outcome or a resource such as Q5 : http://www.teach-ict.com/as_a2/exams/2515_exam_questions/applications_of_ict/dq5.htm and Q3 http://www.teach-ict.com/as_a2/exams/2515_exam_questions/applications_of_ict/dq3.htm Screenshots of responses are taken prior to answers being revealed.

ICT Sample Lesson Plan

GCE ICT H517. G063 ICT Systems, Applications and Implications

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be one hour.

Managing change

3.3.6 (b) describe change management and factors which must be considered (staff capability, staff views, systems, equipment and accommodation) when managing change;

Learning Objectives for the lesson

Objective 1	Students understand what change management is and why change must be managed well.
Objective 2	Students are able to identify the factors which must be considered when managing change.
Objective 3	Students understand what may go wrong if change is not managed well.
Objective 5	Students understand the term protocol and are able to discuss computer to computer dialogue

Recap of previous experience and prior knowledge

- Recap the discussion about possible external changes impacting the organisation

- Get students to think about changes that they have experienced and whether they were easy or difficult experiences.

Content

Time	Content
5 minutes	Warm up activity to start students thinking change and impact of change
15 minutes	Using the handout: http://www.teach-ict.com/as_a2/topics/management_of_change/13.5Themanagement%20of%

Time	Content
	[20change.dot](#) explore internal origins of change and the resultant issues arising from those changes such as redundancy fears. Look at how we manage change well and what makes a good change manager.
10 minutes	Students split into two groups to discuss staff capability, staff views, systems, equipment and accommodation as factors which much be managed. Under each item they list possible ways of dealing with these factors eg training, upgrading systems and equipment, changing procedures, consulting and involving the staff
20 minutes	Students pair up to look at case studies from Heathcote chapter 44 in pairs and use handout to pinpoint what is going wrong + study/answer questions at the bottom of the handout.

Consolidation

Time	Content
10 minutes	Teacher summarises with the important points to note and sets homework questions to cover the topic and extend ideas. These could be past examination questions covering a similar learning outcome or the key points from an associated article such as http://www.bbc.co.uk/radio4/womanshour/2005_22_fri_02.shtml

Other forms of Support

In order to help you implement the new ICT specification effectively, OCR offers a comprehensive package of support. This includes:

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Get Started…towards successful delivery of the new specifications

These full-day events will run from Spring 2008 and will look at the new specifications in more depth, with emphasis on first delivery.

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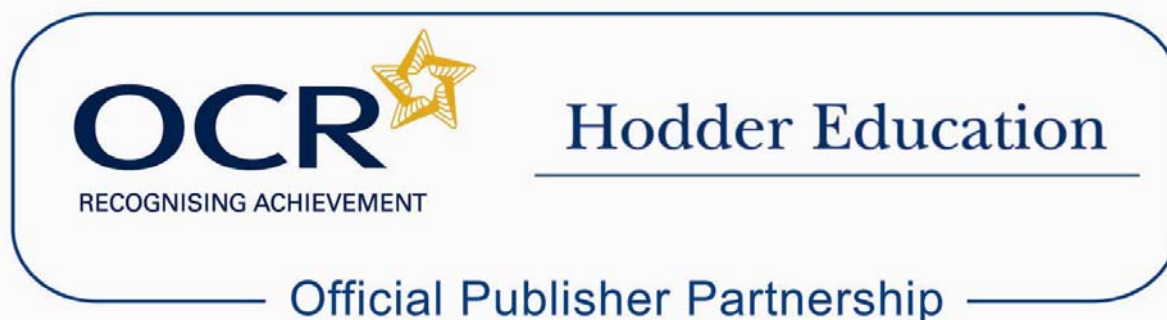
Hodder is producing the following resources for OCR GCE ICT for first teaching in September 2008 [publication – Spring 2008]

Glen Millberry, Sonia Stuart, Paul Long, Ian Paget	**OCR ICT for AS Student edition with Dynamic Learning CD ROM** (Feb-08)	ISBN: 9780340958285
Glen Millberry, Sonia Stuart, Paul Long, Ian Paget	**OCR ICT for AS Dynamic Learning Network Edition CD ROM** (Apr-08)	ISBN: 9780340967003
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