

Higher National Unit specification

General information for centres

Unit title: Decision Support Systems and Intelligent Systems

Unit code: DX41 34

Unit purpose: This Unit is designed to provide a candidate with an awareness of decision support systems and intelligent systems and how the technology drives these systems. It is expected to be delivered utilising the Web as a graphical user interface allowing users the flexibility, efficiency, and to easily view data and models with familiar browsers. The Unit will introduce you to decision-making through a Web type interface as decision support systems and business intelligence is quickly becoming a shared resource across an organisation through intranets and extranets.

On completion of the Unit the candidate should be able to:

- 1 Describe the business environment of Decision Support Systems (DSS).
- 2 Describe Intelligent Decision Support Systems.
- 3 Explain how Management Support Systems are implemented in e-business.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the Centre, however, it would be beneficial if a candidate had achieved the HN Unit *DH37 34 Information Technology: Information Systems & Services* or HN Unit *DV6F 34 e-commerce: Introduction*.

Core Skills: There may be opportunities to gather evidence towards Core Skills in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: This Unit is included in the framework of HND Information Technology Group Award. It is recommended that it should be taught and assessed within the context of the particular Group Awards to which it contributes. It is also recommended that Centres encourage visits to local organisations to enable candidates to gain an insight into different forms of information systems.

General information for centres (cont)

Assessment: Evidence is required to show that the candidate has achieved all Outcomes and Knowledge and/or Skills.

This will be demonstrated by the submission of written and/or oral recorded evidence which demonstrates that the candidate has achieved the requirements of all of the Outcomes and Knowledge and/or Skills within each to show that s/he has appropriate knowledge and understanding of the contents of this Unit.

Outcome 1 will be assessed by a number of objective questions testing knowledge and/or skills.

The evidence for Outcome 2 and Outcome 3 will be assessed by a written and/or oral report of between 1,000 – 1,200 words for **each** Outcome.

Assessors should assure themselves of the authenticity of each candidate's submission for every assessment task. A candidate should sign and date their work upon completion confirming that the work they have presented is their own. A candidate is encouraged to use the Internet in any research, etc, however, the evidence produced **must** be the candidate's own written words.

Outcome 1 must be presented under the correct conditions. Outcomes 2 and 3 are open-book assessments which must be produced under supervised conditions.

Some of the Evidence Requirements may be produced using e-assessment. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical abilities). There is no requirement for you to seek prior approval if you wish to use e-assessment for either of these purposes so long as the normal standards for validity and reliability are observed. Please see the following SQA publications for further information on e-assessment: (1) 'SQA Guidelines on Online Assessment for Further Education' (March 2003) and (2) 'Assessment & Quality Assurance in Open & Distance Learning' (Feb. 2001).

If a centre is presenting Outcomes 1 on-line, the following assessment methods, where appropriate, may be selected:

- ◆ Multiple-choice
- ◆ Drag and drop
- ◆ Multiple response
- ◆ Mix and match
- ◆ A combination of the above

It is expected that the questions will be of the multiple choice variety. Centres may consider the use of alternative questions types, particularly if using Computer Assisted Assessment approaches. However, care should be taken that the questions are valid and at an appropriate level. The use of simple true/false question responses is unlikely to achieve this.

Higher National Unit specification: statement of standards

Unit title: Decision Support Systems and Intelligent Systems

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe the business environment of Decision Support Systems (DSS).

Knowledge and/or skills

- ◆ Characteristics and capabilities of a Decision Support Systems
- ◆ The four components of a Decision Support Systems
- ◆ Modelling and Analysis
- ◆ Business Intelligence
- ◆ Enterprise Information Systems (EIS)

Evidence Requirements

Evidence gathered will cover the following areas:

- ◆ The definition and application of a Decision Support Systems
- ◆ Data Management, Model Management, User Interface Management and Knowledge-Based Management Subsystem
- ◆ Modelling and Analysis of Management Support System (MSS)
- ◆ Data warehousing, data acquisition, data mining
- ◆ The concepts and definitions of an Enterprise Information Systems

Evidence for all the knowledge and/or skills in this Outcome will be assessed using 20 objective response questions covering a representative sample covering **all** bullet points. This assessment must be undertaken in supervised conditions and is closed-book.

A candidate is required to answer at least 60% of the questions correctly. A different assessment should be used for reassessment purposes.

For this Outcome the questions must change on **each** assessment occasion.

Assessment Guidelines

There may be an opportunity for a candidate to be assessed on-line subject to meeting the prescribed assessment conditions.

Higher National Unit specification: statement of standards (cont)

Unit title: Decision Support Systems and Intelligent Systems

Outcome 2

Describe Intelligent Decision Support Systems.

Knowledge and/or skills

- ◆ Knowledge based systems
- ◆ Knowledge acquisition, representation and reasoning
- ◆ Advanced Intelligent Systems
- ◆ Intelligent Systems over the Internet

Evidence Requirements

Evidence gathered will cover the following areas –

- ◆ Concepts and definitions of artificial intelligence (ie expert systems (basic concepts, application and structure))
- ◆ Scope and types of knowledge, knowledge verification and validation and reasoning in rule-based systems
- ◆ Machine-learning techniques, basic concepts of neural networks, genetic and fuzzy logic fundamentals
- ◆ Web-based intelligent systems, intelligent agents classification and agents, Decision Support Systems and multi-agents

Evidence for all knowledge and/or skills item for this Outcome will be assessed by the candidate producing a written and/or oral report of between 1,000 – 1,200 words. All knowledge and skills must be covered. The questions presented to a candidate must change on **each** assessment occasion. The assessment must be undertaken in controlled conditions and is open-book.

Assessors should assure themselves of the authenticity of each candidate's submission for every assessment task. A candidate should sign and date their work upon completion confirming that the work they have presented is their own. A candidate is encouraged to use the Internet in any research, etc, however, the evidence produced **must** be the candidate's own written words.

Assessment Guidelines

There may be an opportunity for a candidate to be assessed on-line subject to meeting the prescribed assessment conditions.

Higher National Unit specification: statement of standards (cont)

Unit title: Decision Support Systems and Intelligent Systems

Outcome 3

Explain how management support systems are implemented in e-business.

Knowledge and/or skills

- ◆ Electronic commerce
- ◆ Integration, impact and the future of Management Support Systems

Evidence Requirements

Evidence gathered will cover the following areas –

- ◆ Overview of e-commerce, e-commerce mechanisms, B2C, C2C and B2B applications, market research, e-CRM and on-line advertising, e-government, e-learning, m-commerce and l-commerce
- ◆ An overview of system integration, models of MSS integration, intelligent modelling and model management, MSS impact on an organisation, issues of legality, privacy and ethics

Evidence for all the knowledge and/or skills in this Outcome will be assessed by the candidate producing a written and/or oral report of between 1,000 – 1,200 words. All knowledge and skills must be covered. The questions presented must change on **each** assessment occasion. The assessment must be undertaken in controlled conditions and is open-book.

Assessors should assure themselves of the authenticity of each candidate's submission for every assessment task. A candidate should sign and date their work upon completion confirming that the work they have presented is their own. A candidate is encouraged to use the Internet in any research, etc, however, the evidence produced **must** be the candidate's own written words.

Assessment guidelines

Sufficient case studies or real world example should be provided for the candidates during the delivery of the Unit to give them enough detail and time to understand the requirements and produce an appropriate response.

Administrative Information

Unit code: DX41 34

Unit title: Decision Support Systems and Intelligent Systems

Superclass category: BA

Original date of publication: July 2007

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History of changes:

Version	Description of change	Date

Source: SQA

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Higher National Unit specification: support notes

Unit title: Decision Support Systems and Intelligent Systems

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is designed to provide candidates with an awareness of decision support systems and intelligent systems and how the technology drives these systems. It is expected to be delivered utilising the Web as a graphic user interface allowing users the flexibility, efficiency and to easily view data and models with familiar browsers.

Candidates are likely to be introduced to case studies and use these to consider decision support systems and intelligent systems. Although this Unit is expressed in generic terms, it should be related to a context, which is familiar to candidates. It would be advantageous to arrange candidates to be exposed to industrial speakers to enhance topics introduced.

Guidance on the delivery and assessment of this Unit

A candidate could be introduced to the way in which managerial decision-making and information systems assist the process of achieving organisational goals using the resources available. The inputs are the resources and the outputs are the achievement of the goals. The definition and application of Decision Support Systems (DSS) could be introduced to a candidate, along with the reason why a DSS may be required. This could be any, or all, of the following:

- ◆ fast computation due to the computer creating the solution
- ◆ improving communications
- ◆ increasing productivity
- ◆ allowing the organisation to gain the competitive edge.

The management of data could be stored in different databases at resources geographically positioned (this could be outside the organization). The DSS application can be composed of the Data Management Sub-System, Model Management Sub-System, User Interface Sub-System and Knowledge Based Management Sub-System.

Data Management Sub-System — The candidate could be introduced to the DSS database, database management system, data directory and knowledge base management systems. The database management system should conform to an organization's standards as well as being consistent, friendly, provide the access to answer queries or provide consistent communication over intranets and intranets. This will involve processing data from two sources, ie internal and external, with internal mainly from the organisation's transaction process system, etc. and external mainly industry data, research census, regional, employment governmental trade, market research, etc. Discussions could be on how the technology has allowed the Internet to be used as the main source for an organisation.

Higher National Unit specification: support notes (cont)

Unit title: Decision Support Systems and Intelligent Systems

Model Management Sub-System — A candidate could be introduced to the following:

- ◆ Model Base (modelling tools, tactical, operational and analytical modelling)
- ◆ Model Base Management System (functions of the MBMS)
- ◆ Model Directory
- ◆ Model Execution, integration and command processor

The User Interface (Dialogue) System — A candidate could be introduced to the following:

- ◆ All aspects of communication with the user and the DSS or any MSS
- ◆ Hardware and software
- ◆ Flexibility and ease-of-use
- ◆ The user interface (ie UMIS (User Interface Management System)) (natural language, standard objects (ie GUI))

The Knowledge-Based Management Sub-System — Many unstructured and even semi-structured problems are so complex that their solutions require expertise. This can be provided by an expert system or other intelligent system.

Model management, user interface management and knowledge-based management subsystem could be introduced along with the following:

- ◆ Modelling and analysis of Management Support System (MSS)
- ◆ Data Warehousing, Data Acquisition, Data and Text Mining
- ◆ GIS (Geographical Information Systems)
- ◆ Business Intelligence and the Internet

Groupwork, Communication and Collaboration:

Groups make most of the complex decisions in organisations with people working together which involves communication and collaboration across an organisation. These communications methods can be electronic and current methods should be introduced, eg electronic meeting systems, video-conferencing, conference calling. The organization must capture the creativity and ideas generated through this process, eg brainstorming, NGT (Nominal Group Technique) and Delphi method.

The concepts and definitions of an Enterprise Information Systems (EIS)

Enterprise Information Systems (EIS) are also known as Executive Support Systems (ESS). A candidate could be introduced to the concepts, definitions and issues in EIS. Items relating to the main individual items within the EIS (eg data warehousing, on-line analytical processing, data mining and business intelligence) should be introduced. Note — This system could, and most likely will, be a web-based system.

Higher National Unit specification: support notes (cont)

Unit title: Decision Support Systems and Intelligent Systems

Reference should be made to Supply Chain Management Systems and Customer Relationship Management concepts and issues.

A candidate can be introduced to knowledge, the description of the different types of knowledge available, and the characteristics of knowledge management.

Organisational learning and transformation where members of an organisation collaborate and communicate ideas, teach and learn with knowledge transferred from individual to individual which could include organisational learning and learning culture within an organisation. There are two fundamental approaches to knowledge management, ie process approach, practice approach, however, the hybrid approach could also be introduced.

The Knowledge Management System Cycle follows six steps which are create, capture, refine, store, manage and disseminate. Knowledge management is more a methodology applied to business practices than a technology or practice with information technology crucial to success. Knowledge management systems are developed using three sets of technologies, ie communications, collaboration, storage and retrieval. Several technologies have contributed to significant advances in knowledge management, artificial intelligence, intelligent agents, knowledge discovery in databases and eXtensible Markup Language (XML).

There are a number of items that could be introduced at this point, eg knowledge servers, enterprise knowledge portals, electronic document management, knowledge harvesting tools, search engines and knowledge management suites.

Since a knowledge management system is an enterprise system it must be integrated with other enterprise and information systems within the organisation with the linkage covering, eg business intelligence systems, artificial intelligence, database and information systems, customer relationship management, supply chain management, the organisation's intranet and extranets. Knowledge management can be evaluated using financial and non-financial metrics.

A candidate could be introduced to a range of items which would include neural networks, genetic and fuzzy logic fundamentals, basic concepts of expert systems (ie experts, expertise and the features of expert systems), how expert systems work and the benefits and capabilities of expert systems.

A candidate could be introduced to the relationship between the expert system and the Internet and intranet can be split into two categories, ie the use of experts systems on the Internet and how the Internet supports expert applications (which will include AI).

Finally, with regards to e-commerce, the candidate should establish the scope, benefits, limitations and types. Introducing examples would be of benefit such as on-line auctions and portals. The candidate could be introduced to B2C, eCRM, on-line advertising, B2B (buy and sell side), B2E (ie business-to-employees), e-learning (benefits and drawbacks), e-government activities, m-commerce (ie mobile commerce), l-commerce (location commerce) and pervasive computing. Ethical standards and their incorporation into law often trail technological innovations and e-commerce is taking new forms and enabling new business practices.

Higher National Unit specification: support notes (cont)

Unit title: Decision Support Systems and Intelligent Systems

A candidate could be introduced to the need, the difficulties and major models for systems integration for MSS. There are several models of configuration, eg ES and DSS. The impact of MSS could be discussed with the impact on organisations, culture and virtual teams, restructuring business processes, etc. The impact would also be on an individual employee of the organisation.

A candidate should research the future of MSS and the far-reaching and dramatic impacts on society and organisations. These range from providing rapid information access, instantaneous communications around the globe, to artificial intelligence assisting and even replacing human effort.

Opportunities for developing Core Skills

(This section should be used to provide information on the opportunities to develop Core Skills in this Unit. It should expand on the summary information given on page 1).

Open learning

This Unit could be delivered by distance learning. However, it would require planning by the centre to ensure the sufficiency and authenticity of candidate evidence. The assessment arrangements outlined above should be suitable for open learning provided regular contact can be maintained with the tutor. For information on normal open learning arrangements, please refer to the SQA guide *Assessment and Quality Assurance of Open and Distance Learning* (SQA, 2000).

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).

General information for candidates

Unit title: Decision Support Systems and Intelligent Systems

This Unit is about developing your knowledge and understanding of the marketing purchasing functions in building competitive advantage and applying this knowledge to build and sustain successful e-business.

Outcome 1 generally focuses on the overall orientation and fundamentals of electronic marketing, different analysis of marketing types are researched with an emphasis on determining a mix of different techniques for a given subject area.

Outcome 2 gives you an understanding of strategic objectives. It continues to give an insight to the difference from traditional business strategy to e-business strategy looking at resources available for reaching specific business objectives. The Unit will then examine an e-marketing strategy that capitalises on electronic technologies.

Outcome 3 details the different features that are available to introduce effective Internet marketing. Affiliate marketing is analysed with a view to collating its advantages with reference to different business models. Search engine optimisation techniques are studied, and a planning process can be designed to efficiently market a business on the Internet. Electronic mail is analysed as a tool for marketing an e-business.

Overall you would be expected to understand e-marketing in e-business and tools that are available online to assist to market research.

You will be assessed for Outcome 1 through this Unit by undertaking a series of questions for each Outcome. Outcomes 2 and 3 are assessed by producing a report for each.