

SQA Advanced Unit specification: general information

Unit title: Human Computer Interaction

Unit code: HR8C 47

Superclass: CB

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Unit purpose

This Unit is designed to provide an introduction into the considerations when designing and creating interfaces for systems. It is aimed at candidates undertaking a SQA Advanced Certificate in Computing/SQA Advanced Diploma in Computing. The Unit is designed to develop the knowledge and skills required to design an interface from a given brief, produce the prototype from the design and evaluate the created interface.

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

- 1 Design a usable interface from a given brief.
- 2 Produce a usable interface prototype using an appropriate tool.
- 3 Undertake a usability evaluation of an interface.

Recommended prior knowledge and skills

Access to this Unit will be at the discretion of the centre.

Credit points and level

1 SQA 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 National 1 to Doctorates.*

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Unit specification: statement of standards

Unit title: Human Computer Interaction

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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

Design a usable interface from a given brief.

Knowledge and/or Skills

- ◆ Interface Usability and Ergonomics
- ◆ Interaction Style
- ◆ Navigation Design
- ◆ Interface Elements
- ◆ Functionality Analysis
- ◆ Design Aesthetics
- ◆ Tools

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can design a usable interface.

The candidate should provide the following evidence:

- ◆ A detailed design for a usable interface that demonstrates all the Knowledge and/or Skills.
- ◆ Documentation of design considerations and justifications for choice, demonstrating all the Knowledge and/or Skills.

This should be an open-book supervised assessment.

Assessors must assure themselves of the authenticity of each candidate's submission.

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Outcome 2

Produce a usable interface prototype using an appropriate tool.

Knowledge and/or Skills

- ◆ Appropriate tool selection
- ◆ Appropriate functionality added to prototype
- ◆ Produce user documentation

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can create an interface prototype.

The candidate should provide the following evidence:

- ◆ Justification of the prototype tool selected.
- ◆ A prototype interface that incorporates all the functionality specified in the given brief.
- ◆ A user guide for the interface prototype, for start-up and use of the software

This should be an open-book supervised assessment.

Assessors must assure themselves of the authenticity of each candidate's submission.

Outcome 3

Undertake a usability evaluation of an interface.

Knowledge and/or Skills

- ◆ Evaluate interface usability
- ◆ Identify and evaluate interaction style
- ◆ Cognitive walkthrough

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can evaluate an interface.

The candidate should provide the following evidence:

- ◆ Documentation of a usability evaluation.
- ◆ Documentation that identifies and evaluates the interaction style used.
- ◆ Documentation of a cognitive walkthrough.

This should be an open-book supervised assessment.

Assessors must assure themselves of the authenticity of each candidate's submission.

Unit specification: support notes

Unit title: Human Computer Interaction

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 included in the SQA Advanced Certificate and SQA Advanced Diploma in Computing Group Awards. It is recommended that it should be taught and assessed in the context of the Group Award to which it contributes. Although the Unit may be delivered on its own, it is part of SQA Advanced Certificate and SQA Advanced Diploma in Computing Group Awards and is aimed at candidates on such programmes of study.

This Unit is primarily intended to give candidates the skills and knowledge required to create smooth human to computer interactions. The interface is the first point of contact a human has with a computing device. The interaction should be easy and supply the required functionality.

Although this Unit is expressed in generic terms, it should be related to a context that is familiar to candidates. If necessary the terminology used in the Unit can be adapted to suit the candidates' learning environment, eg computer interface may be modified to mobile device interface.

In Outcome 1 candidates will gain knowledge about human computer interaction through designing an interface. This can be done by written work or using suitable application software.

- ◆ Interface Usability — suitability for task, error tolerance, goals of use achieved, self-descriptive dialogue, user expectations, consistency, user feedback.
- ◆ Ergonomics — cognitive ergonomics (memory, human skill, user strategies), user centred design, arrangement of display and controls.
- ◆ Interaction Style — direct manipulation, 3D interfaces, tele-operation, Virtual and Augmented reality, discuss GOMS and KLM.
- ◆ Navigation Design — local structure, global structure, screen design and layout
- ◆ Interface Elements — components required depending on end device (mobile phone could be textblock, background image, label, etc.)
- ◆ Functionality Analysis — user goals and requirements.
- ◆ Design Aesthetics — discuss the differences in design principles depending on user group.
- ◆ Design Tools — paper and pen, design specific software.

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Outcome 2 involves taking the designs the candidates created through to finished prototypes, making educated decisions about tools and functionality.

- ◆ Appropriate prototyping tool selection — discuss suitable tool selection criteria.
- ◆ Appropriate Functionality added to prototype — ensure that suitable testing of the prototype has taken place.
- ◆ Produce usability documentation — discuss the contents and purpose of a user guide. Suitable examples may be given and discussed regarding ease of use, readability, etc.

Outcome 3 is where evaluation techniques are learned.

- ◆ Evaluate interface usability — suitability of task achieved, error tolerance, goals of use achieved, dialogue self-descriptive, user expectations met, consistency throughout prototype, good user feedback given.
- ◆ Identify and evaluate interaction style — discuss suitability of interaction style, look at advantages and disadvantages of technique used.
- ◆ Cognitive walkthrough — explain and discuss evaluation through analysis and user participation. Include discussions on cognitive, heuristic and model-based evaluations. List tasks (functions) and create a list of steps to carry out the task.

The assessor must ensure that the candidate evidence is being produced to SCQF level 7. By the end of the Unit, candidates should have acquired a broad understanding of the fundamental techniques used within Human Computer Interaction. Candidates will have gained the knowledge and understanding of important issues surrounding interface design, style and implementation.

Guidance on the delivery of this Unit

This Unit is intended as an introduction to the basic principles of human computer interaction through the area of designing, creating and evaluating an interface. The candidates' creation must be robust, efficient, functional and aesthetically pleasing to the specified user group. The prototype must be created using a recognised prototyping tool.

While the exact time allocated to this Unit is at the discretion of the centre, the suggested time to deliver this Unit is 40 hours. It is also suggested that this Unit is delivered early in the course to give an understanding of system interface types. This will aid understanding for the need of system planning, design and effective user usability. It will also give an insight into the full cycle of development without going into too much development detail at this stage.

Its aim is to obtain competence in designing and creating a usable interface for smooth human computer interaction. The concepts of good practice, such as documentation for the design, walkthrough and evaluations should be stressed throughout.

The candidate should have access to the appropriate prototyping tools. It would be useful to the candidate if they have researched and evaluated other interfaces to gain a better understanding of good and bad design.

The delivery sequence of the Unit should be Outcome 1, Outcome 2 then Outcome 3.

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Outcome 1 allows the candidate to gain knowledge about human computer interaction through an interface. Interaction style, usability and functionality analysis skills are all practiced before attempting the assessment.

Outcome 2 puts into practice the skills and knowledge learned in Outcome 1, taking the design the candidate created through to a finished prototype, making educated decisions about tools and functionality.

Outcome 3 is where evaluation techniques are learned. Evaluation has three main goals: to assess the extent and accessibility of the system's functionality, to assess the users' experience of the interaction and to identify any specific problems with the system. Various techniques are discussed and the opportunity should be given to practice before candidates are assessed on this Outcome.

Candidates should always be encouraged to consider other solutions to problems, document the design and test the design, before implementing the solution in the chosen platform or targeted area.

The assessment for Outcomes 1, 2 and 3 should be combined as part of a single assessment for the Unit. The assessment requires that candidates are given a brief. The content of the brief should allow candidates to design, prototype and evaluate a useable human computer interface prototype which covers all evidence for Outcomes 1, 2 and 3.

Guidance on the assessment of this Unit

It is recommended that all Outcomes are integrated into one holistic assessment which takes the form of a project. This project should require the candidate to design, create and evaluate an interface prototype from a given brief and provide supporting documentation. The interface specification can be based upon a specific device depending on the current situation of the candidates and their prior experience.

It would also be possible to break this assessment down into three separate assessments that assess each Outcome individually.

The assessment/s should be completed on an individual basis under open-book supervised conditions.

Assessors should ensure themselves of the authenticity of candidates' evidence.

A single project assessment is recommended, with the model broken down into identifiable and assessable stages allowing the tutor the opportunity for regular monitoring of the candidate's progress and allowing time for intermittent remediation.

Throughout the assessment a report should be produced, and presented in a suitable manner.

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The project should relate to a human computer interaction such as an interface within a particular area which the candidate is familiar with. The project specification should include background information on the application, the main functionality required and the proposed user group. The specification should also dictate the device type where the interface is most likely to be installed. This will aid prototype tool selection.

An example may be:

Your manager has requested that you design, create and evaluate an interface for a Windows mobile phone application. The application called 'MyMusic' is an application that is used to play music from your mobile device. The application allows the user to view playlists, view by albums and view by artist. The user will also be able to create a new playlist and add a song to that playlist.

The application is being marketed at the younger generation age group between 13 and 25. The design should be easy to navigate, look appealing to that age group and interact with user in a suitable fashion.

Your manager has requested that you hold a meeting on completion of each step to allow feedback and input on the project. You must hold this meeting before continuing to the next step. Therefore after the design step you should hold a meeting, after prototype creation the middle meeting, and the final meeting after the evaluation step.

You should have all relevant documentation completed at each step. At the design step you should have a report with your design considerations, interaction style and justifications for choice.

At the creation step you should have a report justifying your prototype tool and include a user guide for your prototype. You should also have your completed prototype to review and discuss.

At the evaluation step you should have a report detailing the usability evaluation, interaction style evaluation and cognitive walkthrough findings.

Where this example is used the Windows Phone emulator should be used as the prototype tool, which should be made available to the candidate.

Alternatively this Unit could be assessed using three separate assessments, although it would be easier to manage if the same case study was used throughout the Unit.

Online and Distance Learning

This Unit could be delivered by distance learning. However, it would require planning by the centre to ensure the authenticity of candidate evidence. Arrangements would need to be made to ensure that the single assessments for Outcomes 1, 2 and 3 are delivered in a controlled supervised environment.

It would be recommended that a single project based assessment be used for open and distance learning candidates.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*.

Opportunities for developing Core Skills

In this Unit, candidates will develop the skills needed to enable them to plan, design and create a prototype of an interface. The candidates will also evaluate an interface.

As candidates are doing this Unit they will be developing aspects of the Core Skills in *Problem Solving, Communication and Information and Communication Technology (ICT)*.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

History of changes to Unit

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our [Centre Feedback Form](#).

General information for candidates

Unit title: Human Computer Interaction

In this Unit you will develop the knowledge and learn the skills required to help you plan, design, create and evaluate an interface prototype relating to a typical problem within a computing context.

To achieve this you will learn about the various stages involved in developing the prototype interface, the documentation produced to support the development of your solution, and finally the different ways by which your prototype may be evaluated.

Human performance and user experience with a computer or device will remain a rapidly expanding area. The goals of a successful designer are to identify and cater for the user's needs, ensure reliability, promote standardisation, consistency and portability. Multiple design alternatives must be evaluated for specific user communities: a clever design for one device may not work on another; similarly a design for one user group may not be suitable for another. For effective Human Computer Interaction, modern devices require an interface to be easy to use, easy to locate desired function, low error rate and subjective satisfaction. These are paramount because frequency of use is high and competition is fierce.

In this Unit you will:

- ◆ learn the key topics for a successful interface
- ◆ learn usability techniques and how ergonomics can be applied to your particular project
- ◆ learn about interaction styles and how they can be used in various projects, eg flight simulator designers use Virtual Reality to create the most realistic experience
- ◆ learn how important good, simple navigation is to the user
- ◆ learn how to extract the functionality from the specification that will enable better choice of interface elements
- ◆ learn about aesthetics and the balance between function and fashion

You will develop a prototype for a given project. You will learn the selection tools available for your specific project, such as the mobile emulator if your project required an interface for a mobile phone application. You will use the tool to create the prototype ensuring all functionality has been included.

You will evaluate the usability of the prototype in relation to the project. You will be able to identify if the interaction style used is suitable and most relevant to the given project. A cognitive walkthrough will help identify any missing functionality and ensure flow of consistency.

To complete this Unit successfully, you will need to achieve a satisfactory level of performance in all three areas. If you are being assessed using a single project, you will be given this piece of work near the end of the Unit. You will be expected to design and prototype usable human computer interface and evaluate it.

The skills you will learn in this Unit should prepare you for any Unit which may follow and serve as an initial foundation in planning a solution within computing development. Careful attention to good design and thorough evaluation of the solution to a problem will form a solid basis in the production of high quality, reliable and efficient product.