

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

Evaluation of software (Chapter 54)

- Describe the mechanisms/procedures for software evaluation.
- Establish client/user needs, establish software capabilities and match.

Evaluation Criteria (Chapter 54)

- Understand the need for establishing evaluation criteria:

Agreed problem specification.	Functionality.	Performance - use of benchmarks.
Usability and human-machine interfaces.	Compatibility with existing software base.	Transferability of data.
Robustness.	Financial issues - development cost, development opportunities.	Resource requirements including hardware, software and human.
Upgradability.	Portability.	User support.

Evaluation Report (Chapter 54)

- Understand the function of an evaluation report and know that the content will include: methodology used actual evaluation, recommendations, justifications.

IMPORTANCE

- There may be legal consequences for the software manufacturer

http://catless.ncl.ac.uk/Risks/17.01.html	http://www.hamiltons-solicitors.co.uk/archive-docs/Intuit.htm
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Court Rules against Faulty Software (November 1996)

Software companies often deny any legal responsibility for repercussions of the release of faulty software. Ruling by Court of Appeal may give consumers ammunition to fight back against bugs.

Computer company (ICL) and ST Albans County Council. ICL supplied council with tailor made software to monitor the collection of its community tax. Unfortunately the software miscalculated the number of people in the area and the council suffered a huge financial loss.

ICL's get-out clause was overturned by the judge who argued ST Albans had bought the software to do a specific job and it should have carried it out.

- The reputation and hence the possible survival of the software manufacturer relies on good quality products that meet customer needs.
- The consequences of a poor mismatch for the purchaser might be financial or in certain circumstances even fatal.

The need for establishing company wide evaluation criteria

- Software generally has a longer life than the hardware platform
- To establish and set priorities

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

- To make a judgement of its preferences, considering **opportunity costs**
- To provide discipline in developing systems
- To establish an organisation-wide standard approach for gathering specifications and designing, programming and testing new system
- To establish what are the appropriate tools acceptable

This should result in

- Standards which make it easier to develop, test, audit and maintain effective systems
- Reduce the cost of training
- Increase the flexibility of users
- A disciplined approach reduces the number of system defects

Choosing Software Heathcote Chapter 54

<http://www.becta.org.uk/technology/software/curriculum/evaluation3.html>

An ICT system will often be ordered and designed complete so that hardware, software, operating procedures and documents used within the system form an integrated whole. There will however be situations where either new software is installed to extend the range of tasks carried out by the system or existing software is replaced or upgraded.

The organisation may have a choice of a number of different applications from various suppliers, each of which might claim to perform the required task. Some method is needed whereby the organisation can evaluate the different packages under offer to decide which one most appropriately matches their particular needs.

The process of evaluation begins with the identification of the end users needs. No proper decision can be made unless there is a clear idea of the exact tasks that must be performed by the software. Knowing what functionality the user requires will give an idea of the type of package required; the users experience and the way in which the package will operate will indicate the type of user interface needed. Once this starting point is established it will be possible to identify software that matches the user's needs.

A number of questions need to be asked when looking at existing systems. (p.296)

- Is the existing software up to the current demands of the business?
- Are there better solutions than what we are using at the moment?
- Are updates to existing software now available?
- Consider the existing user base.
- The main options are to buy generic or bespoke software or to develop the software in-house.
- It might be worth looking at what competitors are using. Is there a package, which is considered to be the "industry standard"?

Criteria for Evaluating Software p.296/297

<http://sysdev.ucdavis.edu/WEBADM/activities/a3-/a3-8-2/a3-8-2.htm>

The rules that govern the evaluation will probably include most of the following: -

Functionality

- What business functions are supported by the package?
- Will it generate required forms?
- Search facilities?
- What are the editing capabilities?
- Are there links to other packages? (data portability)

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

- Macro capabilities?
- Is it able to change or extend data and record structures?

Performance

- e.g. by use of benchmarks or ranking (see below)

http://www.dell.com/us/en/esg/topics/power_ps4q01-benchmarks.htm

Usability i.e. does the overall operation feel comfortable or confusing?

- Does data entry move along at a good speed (or are there unsatisfactory idle periods between entries)?
- Are HELP and EXIT routines provided?
- Is it easy to learn?
- Are manuals supplied
- Do screen formats appear uncluttered and consistent? (good HCI)
- Are ERROR correction messages understandable and solvable?
- Are tutorials supplied?
- Are training courses available?
- Might be measured by surveys and by the training time required

Compatibility

- Are file exchanges with the existing software base possible?
- Is the software compatible with existing software and hardware?

Transferability of data.

- Implications of package change/upgrade
- Problems of incompatibility
- File transfer times

Robustness i.e.

- Measure by the number of bugs per 1000 lines of code
- There are difficulties in thoroughly testing complex software and implementations

User Support.

Is there hot line support?

Is support on-site?

Is there a bulletin board?

Resource Requirements

- Are MY hardware requirements satisfactory? (e.g. minimum memory, supported printers, computer brand)
- Are required add-on hardware/software available at a satisfactory cost?
- Is the correct operating system available?

Upgradability (p.297)

- Some software developers might be prepared to modify an off-the-shelf package. This option often produces very unsatisfactory results (see quote from Tony Collins, page 297).
- Is the software upgradeable? This is important for a business that is planning to grow.

Cost

- The cheapest package on offer is not necessarily the best. The capabilities of the software need to be examined. Equally, the most expensive is not necessarily the best because it might contain a lot of features that the organisation doesn't need
- Cost is an important factor (consider both the cost of the software and cost of technical support and upgrades)
- The cheapest solution might well be off-the-shelf packages but do they do what is required.
- Are there development costs in the use of application generators?
- Any hidden extras? e.g. Training costs are often underestimated.

Vendor Quality

The different packages on the market could be examined by reading software reviews in computer magazines

- Consider the reputation of the manufacturer (Do they have lots of satisfied customers?)
- What is the reputation of the vendor?
- Are updates provided?
- Is training provided?

Flexibility

- Can the software be tailored to the particular needs of the organisation.
- Can modifications that are not standard be made?

Methods for evaluating software

Benchmarking p.298

- A technique used to compare the performance of different computer systems falling within a similar technological category. A range of standard tests is carried out to allow reasonable objective comparison. This system can help make the right decisions in purchasing and give a realistic estimate of raw performance. The potential performance is shown when running a mix of real-world applications and whether the system will 'break' or crash when processing heavy workloads
- e.g. BYTE in August 1996 baseline was 90mhz Pentium system with an adjusted score of 1. So if a system scores 1.5 its 50% faster.

Weighted ranking <http://www.uplinkinc.com/mss/erpsoftware.html>

A number of features are given numerical weights to reflect their relative importance - these vary from business to business and task to task.

Example - used for an invoicing system

Purchase cost

Weight 5 (relatively unimportant)

Maintenance

Weight 6 (from reputable source so these are expected to be slight)

Robustness

Weight 10 (very important must be able to cope with heavy work load and number of different users)

User friendliness

Weight 12 (vital to system efficiency)

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

Report and Invoice printing
Quality of screen display

Weight 12
Weight 10

Weighted Ranking				
Software (3 is best and 1 is worst)				
Feature	A	B	C	
Purchase Cost		3	1	2
Maintenance		2	1	3
Robustness		1	2	3
User friendliness		2	3	1
Report		3	2	1
Screen display		2	1	3
System Scores (Ranking*Weighting)				
Feature	Weight	A	B	C
Purchase Cost	5	15	5	10
Maintenance	6	12	6	18
Robustness	10	6	12	18
User friendliness	12	24	36	12
Report	12	36	24	12
Screen display	10	20	10	30
	Total	113	93	100

The Evaluation Report P.298 <http://imfundo.digitalbrain.com/imfundo/web/teach/edusoft1/>

Once the different software options have been evaluated then an evaluation report will be produced. The function of this report is to provide the basis for making the final selection of the software to be used.

Content of the Evaluation Report

- An introduction stating the purpose of the report
- The Methodology used
- The actual evaluation, including the capabilities of the software, results of benchmark tests, upgrade paths, compatibility with the existing user base etc.
- Recommendations
- Justifications for the recommended purchase

EXAM QUESTIONS

1996 (12 marks)

You are asked to evaluate a Software Package and produce an Evaluation Report.

(a) Describe four criteria you would use to evaluate the package (8)

(b) What is the function and content of an evaluation report? (4)

(a) Any 8x1

<i>Agreed problem specification</i>	<i>Functionality</i>
<i>Performance - use of benchmarks</i>	<i>Usability and human-machine interfaces</i>
<i>Compatibility with existing software base</i>	<i>Transferability of data</i>
<i>Robustness</i>	<i>User support</i>
<i>Resource requirements including hardware, software and human</i>	<i>Financial issue - development cost, opportunity costs.</i>
<i>Portability</i>	<i>Upgradability</i>

(b)

Function:

- *to document how the software performed against the criteria set to enable a decision to be made*

Content

- *purpose*
- *structure*
- *methodology*
- *content*
- *recommendations*
- *justifications*

1998.8 (14 marks)

A company is about to change its accounting software. In order to evaluate the different packages available to them, they draw up a number of evaluation criteria.

(a) Why are such evaluation criteria needed? (2)

(b) Explain the issues involved with each of the **three** evaluation criteria given below:

Functionality

User Support

Hardware Resource Requirements (6)

(c) Identify and describe **three** additional evaluation criteria that you might also expect the company to include. (6)

(a) *To enable an unbiased and objective comparison between systems (1)*

To allow a comparison between user needs and software capabilities (1)

(b) *For each evaluation criteria: Max. 1x2.*

Functionality: *need to establish tasks the software carry out (1) and tasks that are essential to user (1) in order to establish whether the software meets clients needs (1)*

User Support: *Ability of user to support software with existing staff skills (1), scope of software support available from software house (1), user base and scope of support from user groups (1), organisational training strategies (1), etc.*

Hardware Resource requirements: *cost of upgrading current hardware to cope with new software (1), e.g. memory demands of each package (1), possibility of different hardware platforms (1), minimum spec to run system (1), demands etc.*

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

(c) For each criteria: 1 mark for naming and 1 for describing the **scope** or **nature** of the evaluation criteria. The answers given here are only possible examples and are not exhaustive. Criteria include:

performance (1) : use of benchmarks, agreed performance measures against which each application can be compared(1)
usability & HCI:(1) , degree of on-line help provided by user interface (1)
Compatibility with existing software base (1), ability to exchange data between new application and packages currently used. (1)
portability/transferability of data (1) , ease of transfer of accounting records from current system to each of the potential new ones (1)
reliability/robustness (1) - extent to which each new application performs on different hardware configurations (1) – known bugs, performance under error conditions
Upgradability (1) degree to which clear upgrade paths are available to accommodate hardware and software developments (1)
financial issues (1) : cost of implementation, cost benefits (1)
Legislation/budgetary issues (1): EMU, VAT rates, Y 2 K etc.

1999.8 (12 marks) A university has decided to buy a new payroll package. They are considering several options and have drawn up a range of evaluation criteria to help them select the most appropriate one.

(a) The criteria used by the university include:

- ‘Performance’,
- ‘Robustness’
- ‘User support’.

For each of these criteria, describe two issues that you would expect the university to consider.

(b) Describe three other criteria you would expect the university to apply when comparing systems. (6)

(a) Candidates must go beyond rephrasing the term. e.g. it is not enough to explain the meaning of ‘robust’

<p>Performance:</p> <p>Use of benchmarks (1), Definition of benchmark e.g. standard tests/ sequences of operations performed on all systems (1) Example of a benchmark test – e.g. measure time taken to search 10,000 records for one record (1) Or Speed of calculation (1) Or accuracy of calculations (1) Process existing data and compare output of new system with that of the existing system (1)</p>
<p>Robustness</p> <p>Scale of known errors/no. of known bugs in current release (1) What happens when erroneous data is deliberately input/attempts to carry out erroneous transactions. (1) E.g. Try deleting tax record when there are pay records stored for that person. (1) Test the system with large volumes of data. (1) Test the system with many users. (1)</p>
<p>User Support:</p>

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

Ability of University to provide own user support (1)
Measure call response times when logging a problem with software house (1)
Ask existing users of system/supplier (1)
Are the sources freely available (1)
Is there a user community we can tap? (1)
Availability of on-line help or good documentation (1)
Availability of training from software house or other organizations(1)
Help desk availability (1)
Help desk costs/charging structure (1) $3x(1+1)=6$
(b) Other criteria might include
Functionality – check list of features provided or required (2,1,0)
Compatibility with existing systems, file format, user interface, platform (2,1,0)
Transferability of data, import of data from previous system or other systems within organisation (2,1,0)
Upgradability- future upgrade paths (2,1,0)
Portability, ability to run on different platforms (2,1,0)
Financial issues, development costs, turnkey cost, cost benefit, total cost of ownership (2,1,0)
Reputation of vendor, likelihood that vendor will exist for the lifetime of the product (2,1,0)
Complexity of system (2,1,0)

2002.1 Software houses go through a long testing programme before releasing a product. Despite this, problems can still occur with that product.

Give **three** reasons why testing may not be completely successful. **(3 marks)**

- *requirement to keep development cost to defined limits (1)*
- *requirement to keep development time to deadlines (1)*
- *in order to gain/maintain edge over competition - get product to market first (1)*
- *user has used product in a way that no-one has previously done (1)*
- *new hardware/ software is released the company was not aware of (1)*
- *inadequate test plan / data (1)*
- *etc.*

2001.10 (20 marks)

A company that specialises in selling bicycles, spares and related items is considering having a website that will allow customers to order on-line. It already uses a relational database to keep records of customers, stock and orders.

As an IT consultant, you have been approached to assess the viability of several alternative software solutions.

Discuss how you would help the company decide on a suitable software solution. Your discussion should include:

- What you need to find out in order to carry out this assessment;
- The evaluation criteria that you would consider using
- The content of the report that you would produce to show the results of your evaluation.

A large market research company is considering several different software packages in order to assist with the analysis of data collected on behalf of clients.

Maximum mark for content is 16/20. Up to 4 marks are available for the assessment of Quality of Language.

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

What needs to be found out and why – code as n max. 6

Establishing end user requirements (1) in order to establish that the company has realistic aims that can be met/to find out what is important to the user(1)

The nature of the systems that are currently in place (1) in order to establish to starting position of the company (1)

Functionality available (1) so that this can be matched to the user requirements (1)

Available alternatives (1) so that these can be objectively compared (1)

Budget restraints (1) in order to ensure that the company stays within its own financial limits (1)

Will the company make use of an ISP or host the website themselves? (1) and how secure is this provision? (1)

Appropriate evaluation criteria – code as c max. 6

N.B. Identifying a relevant criterion (1) and giving a reason or other qualification (1) to a maximum of 3 criteria. This is a maximum of 6 marks, 3 x (2,1,0).

Criterion – 1 mark Reason – 1 mark

<i>Functionality</i>	<i>Will the software provide the functions required by the company</i>
<i>Performance</i>	<i>Does the company have access to the resources required to cope with the demands of the user/does the server have enough capacity to deal with the increased workload</i>
<i>Compatibility with existing software base</i>	<i>Can the software integrate with the already established database</i>
<i>Transferability of data</i>	<i>What extra will need to be purchased in order to allow data to be moved between systems</i>
<i>Robustness</i>	<i>If there is a sudden demand made upon the system, will it be able to handle it?</i>
<i>Resource requirements</i>	<i>Do the hardware and human resources necessary already exist in order to be able to use the software?</i>
<i>Accessibility</i>	<i>How will users be able to interact with the solution, e.g. through the use of interactive TVs, web 'phones?</i>
<i>Upgradability</i>	<i>How easy will it be to make changes to the solution when it is felt necessary</i>
<i>Support</i>	<i>How is the support supplied – online/manual.contract</i>

Report produced – code as R Max. 6

Purpose of report is to show how the proposed solution would measure up to the expectations of the company (1)

Description of methodology used to produce the report (1) detailing how information was gathered and a description of how the evaluation has been carried out (1)

Evaluation itself, detailing how well the system compares to the criteria decided upon (1)

Recommendation based on the evaluation (1) with justifications of how this was arrived at from this evidence (1)

A2 MODULE 5 (ICT5) TOPIC 14.2 SOFTWARE

ICT5 June 2002.4

Give **three** criteria that should be considered when evaluating these software packages. For each criterion, explain why it may be important to this company. (9 marks)

Give one mark for a relevant criterion and two for a reasonable description up to a maximum of 3 criteria and 3 descriptions. Description marks are dependant upon criterion marks. Description must reflect the context in order to gain the third mark.

Criterion	Reason
<i>Functionality</i>	<i>The software will have to provide statistical functions (1) so that the research company can produce the relevant analysis (1).</i>
<i>Robustness</i>	<i>The company will be dealing with vast quantities of data (1) and the software will have to deal without crashing (1).</i>
<i>Performance</i>	<i>The company will require results to be produced in a reasonable time (1) so the software package must be more efficient than current methods (1).</i>
<i>Support</i>	<i>The company will require access to support initially as training (1), but also in future if things go wrong (1).</i>
<i>Portability</i>	<i>The company may use other software to present the results of their analysis (1), and so this package must have an export function (1).</i>
<i>Transferability</i>	<i>Any existing data the company holds that is useful for analysis should be available to the new software package (1) without the need for re-entering data (1).</i>
<i>Appropriateness/ Suitability to end user</i>	<i>(NB NOT EASE OF USE) Can't guarantee ICT literacy level of end user (1) company wants old and new employees alike to use the package quickly (1).</i>
<i>Future proofing/ Upgradability</i>	<i>The software will have to be of use for a significant length of time (1) so the company will not have to have further investment in the same area in the future (1).</i>
<i>Compatibility</i>	<i>The company will have systems in place (hardware and/or software) (1) and the new package will have to function effectively with these (1).</i>
<i>Cost Benefit</i>	<i>(NB NOT COST) The company may be prepared to pay extra (1) in order to gain extra functionality (1).</i>

Spring 2003.2

Give four reasons for producing an evaluation report when considering alternative software solutions to a particular problem. (4 marks)

- | |
|---|
| <ul style="list-style-type: none"> • <i>To present the overall findings of the evaluation to the person(s) requiring the evaluation to be carried out (1)</i> • <i>To show the end user which packages were being considered as possible solutions (1)</i> • <i>To detail the required functionality that was being checked for in this evaluation (1)</i> • <i>To describe how the evaluation has been carried out/ methodology (1)</i> • <i>To show the results of the evaluation for each package being considered (1)</i> • <i>To give the end user a recommendation based on the evaluation carried out (1)</i> • <i>To give the end user justification for the recommendation made (1)</i> |
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June 2003.7

A car insurance company needs to replace the computer application that it uses to provide quotations. The company decides to look at several software packages that may provide this replacement.

(a) (i) Why should evaluation criteria be established before comparing the packages? *(1 mark)*

(ii) "Functionality" and "User Friendliness" have already been established as important criteria for success. Name two other criteria that could also be used in this situation. For each criterion, describe why it is relevant to this company. *(6 marks)*

(b) The company decides that there is no readily available application that exactly fulfils its needs. It therefore decides to employ an external development team to provide a bespoke software solution.

(i) State one advantage of this approach. *(1 mark)*

(ii) State one limitation of this approach. *(1 mark)*

(c) What is the purpose of using a team to develop a software solution rather than just one individual? *(2 marks)*