

Section 2

Specifications

By the end of this Section you should be able to:

- Identify Project Aims
- Evaluate User Needs and/or Preferences
- Identify Resources and Constraints
- Consider the Effect of Skills and Technology
- Understand the use of IT in Business
- Identify Changes to the Original Plan
- Evaluate Solution Options
- Choose a Solution

Exercise 4 - Identify Project Aims

Guidelines:

The solution to any problem starts with the problem itself. Communicate with the people involved. Hold meetings with the staff involved, both collectively and individually. Gather information on the problems facing them and investigate their requirements for a solution. Make sure you know what the problem actually is. People may be talking about the symptoms of the problem rather than its cause. The notes collected here will help to formulate the requirements of the project the project aims.

The aims of the project, i.e. the main outcomes that the project is meant to achieve, must be clearly identified before any project development can continue. If this is a well defined supplied project, the aims may come from the definition of the task itself; if this is your own project, the aims may be up to you. In either event the aims must be positively established and recorded.

Having specific and documented aims is useful as it helps keep the development 'on course'. Constantly checking against the original project aims can prevent effort being spent on areas that are not relevant.

Assessment

Identify and record at least three aims of the solution.

Example:

1. In the sample scenario the aims of the project can be extracted from the scenario description. These could include:
 - To produce a system that will allow the hours worked by the casual employees to be entered and processed in an efficient and accurate manner
 - To produce a system that will automatically calculate pay for hourly paid staff in all situations
 - To produce a system that will provide hourly paid staff with a breakdown of their pay
 - To produce a system that will provide management with an analysis of the casual staff costs
2. Some processes, which may form a part of all projects, could be specifically highlighted as aims in certain projects, e.g. reviewing current systems, documenting systems, formulating training plans. This is probably not relevant in the sample scenario.

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Exercise 4 - Continued

- Even though the project aims may seem well defined, it is good practice to include a meeting with the project 'owner' and agree with them that the aims have been defined correctly. In this case a memo from the Finance department manager agreeing the points set out in the aims document would be a useful inclusion.

Actions:

- Use *Microsoft Word*, or some other word processing application, to open a blank document. Add the title **Specification** to the top of the document using a suitable **Heading** style.
- Using **View | Header and Footer**, add **CANDIDATE NAME** followed by your name and the **CENTRE NUMBER** followed by the number in the document footer.
- Enter a sub-heading of **Aims** and record at least 3 aims for the proposed solution. These should describe the main ways in which the new system will improve the current situation. Step 1 of the **Example** text of this exercise lists 4 possible aims of the example solution and these can be used as the basis for the response.

*Note: Completing this section of the guide has allowed the following elements of the **Evidence Checklist** to be completed. In your checklist, the ticks must be replaced by the page numbers of your portfolio where the relevant evidence is located. This task may have to be delayed until the portfolio is complete and page numbers have been applied.*

1	Identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1a	Identify and record the aims of the solution (min3)	✓	<input type="checkbox"/>
		✓	<input type="checkbox"/>
		✓	<input type="checkbox"/>

- Save the document as **Specification** and leave it open.

Exercise 5 - Preferences

Guidelines:

Once the overall aims of the project have been set, the needs and preferences of all users or clients of the system can be considered.

If these are not apparent from the scenario description, they must be created to fit what might be reasonably expected in a real situation. In any event the needs/preferences must be positively established and recorded.

Assessment

Identify and record at least three needs/preferences of the solution.

The needs/preferences recorded here will play a part in the subsequent development of the project. They may, for example, be relevant when deciding possible IT solutions, or they may become part of a list of constraints produced during planning.

They will also determine the goals of the project. Any goals which are defined must be measurable, in order that evaluation can take place. It is not sufficient to say the goal is to 'improve' a situation because this in itself is not measurable. To say that the goal is to 'increase user satisfaction' however is valid because this is something which could be evaluated, using questionnaires for example. The measures which could be used to assess the goals include:

- Productivity Are there any increases in efficiency? Can the same people do the same task in a shorter time, so allowing them to do more tasks?
- User satisfaction Are people connected to the solution more satisfied with the overall operation of the system?
- Cost Are there any direct cost savings as a result of the new solution?
- Accuracy Is the output from the new solution more accurate and relevant than it was before?
- Auditability Is it easier to trace back and determine how all the output from the new solution was achieved?

Some of these measures may overlap, for example an increase in productivity can result in cost savings.

Some needs/preferences of the solution may conflict with others, or conflict with the overall aims of the project. Decisions will need to be made later in the process to resolve these issues.

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Exercise 5 - Continued

Example:

1. In this instance, reasonable user needs/preferences can be constructed from the scenario description. These could include:
 - a) Payroll staff want to receive standard forms from the departments.
 - b) Payroll staff want to use form type screens for data input with some degree of data validation built in.
 - c) Payroll staff want the calculations to be done with as little user input as possible.
 - d) Casual staff need a printout of which hours are being paid.
 - e) Managers of hourly paid staff do not want to have any extra work with the new system. They are happy with the current system.
 - f) The Finance Manager would like an analysis of casual pay immediately after it is calculated on a Tuesday.
2. Measurable goals of the solution can be derived from these needs/preferences. For example:

Points a, b and c should lead to increased accuracy on the final payslips and also to increased productivity by the payroll staff. Both of these can be measured by comparing performance before and after the solution is operating.

Point d should lead to increased user satisfaction of the casual staff but could also increase productivity by reducing the number of queries handled by payroll staff.

Point d could also be thought of as increasing auditability. It will be easier to see how any final pay value has been calculated, which will be helpful in any queries.

Points e and f should increase user satisfaction amongst managers.

A reduction in costs should be achieved as the payslips will be produced more quickly and with fewer mistakes. Timings can be taken before and after the solution to compare.

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Exercise 5 - Continued

Actions:

1. Create a new sub-heading of **Needs/Preferences** in the **Specification** document.
2. Record at least 3 needs/ preferences for the proposed solution. These can be based on the text in step 2 of the **Example** section of this exercise.
3. Record any goals that result and plan what measures are required to assess the success of each goal.

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1	Identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1b	identify and record the needs/preferences of the solution (min3)	✓ ✓ ✓	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

4. Save the document as **Specification** and leave it open.

Exercise 6 - Resources and Constraints

Guidelines:

Any proposed solution to the original task will involve the availability of some resources and it is important that these resources are identified at an early stage in the specification process. The availability of resources could seriously affect the way in which a solution is developed and therefore this needs to be established as soon as possible. It would not be efficient to develop a system which depended on a number of networked computers being available, only to discover at the end that no networking system existed.

Similarly, there will be constraints which affect the way in which a solution is developed and therefore need to be established as soon as possible. It would not be efficient to plan an excellent solution which will take 6 months to develop if it must be ready for the financial year end in 3 weeks' time.

Assessment

Identify and record the present and future resource needs for the solution.

Identify and record at least 2 constraints of the solution.

Resources can include such things as:

- **Hardware** - how many personal computers are available and what specification are they?
- **Software** - what software applications are available?
- **People** - how many people are available to operate any new system?
- **Skill levels** - what levels of expertise do the available people have?
- **Support** - what level and amount of support will be available?

Obvious constraints would be the non-availability of any of the required resources mentioned above, but others can include such things as:

- **Timescale** - are there limits as to when the solution must be available?
- **Costs** - are there limits as to the development costs of the solution?
- **Policy and style** - are there any existing policies/styles within the organisation which may affect the form of the solution?
- **External factors** - what impact will the solution have on people outside the organisation, e.g. Customers, Suppliers, Public?
- **Personal preference** - are there any strongly held personal preferences which may affect the form of the solution? The importance of this factor depends largely on the importance of the person with the preferences.

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Exercise 6 - Continued

Example:

1. Some of the relevant resources available in the sample scenario are:
 - Each person in the Finance department has their own personal computer.
 - Each person in the Finance department is skilled in computerised data entry.
 - All computers run *Microsoft Word, Excel* and *Access* as a minimum.
 - The computers are linked by a network which includes computers in the Personnel department.
 - A high level of technical support is available from the IT department, including considerable *Access* expertise.
2. Some of the relevant constraints applying to the sample scenario could be:
 - There are no extra staff available to operate any new system. The solution must be capable of being operated by the existing staff and take up no more time than the existing system.
 - The departments employing hourly paid staff are not part of the computer network (so it would be difficult for them to enter their own data).
 - The Managing Director has decided that the system must be in place for the start of the new summer season, which is in 5 weeks' time.

Actions:

1. Create a sub heading of **Resources** in the **Specification** document.
2. Record details of some of the resources which are relevant to the proposed solution. These can be based on the text in **Example** step 1.
3. Create a sub heading of **Constraints** in the **Specification** document.
4. Record details of at least 2 constraints which are relevant to the proposed solution. These can be based on the text in the Example section of this exercise.
5. The lack of extra staff and the lack of comprehensive networking would be classed as **resource** constraints.

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Exercise 6 - Continued

6. The time limit imposed by the Managing Director is significant because it rules out possible features of the solution which may be desirable but would take too long to implement. This could be classed as a **timescale** constraint.

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1	Identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1c	identify and record the present and future resource needs for the solution	✓	<input type="checkbox"/>
1d	identify and record the constraints of the solution (min2)	✓	<input type="checkbox"/>
		✓	<input type="checkbox"/>

7. Save the document as **Specification** and leave it open.

Exercise 7 - Skills and Technology

Guidelines:

One of the resources mentioned on the previous exercise was the skill levels of the potential solution users. These should be looked at very carefully to see if there are any gaps between the skills they have and those needed to successfully operate the solution.

If there are any such skill gaps it will be necessary to specify some learning resources to meet this requirement.

On a more general level, problems may arise due to a possible reluctance of non-technical users to accept the change to an IT based system. There is sometimes a fear that IT systems will be difficult to deal with and inflexible. You should record benefits and drawbacks of the solution in a simple way, so that users' fears may be alleviated.

Assessment

Identify and record the skills gaps and learning needs of the users of the solution.

Identify and record benefits and drawbacks of technology and skills.

It may be that different users may have different training needs. The person(s) responsible for running an application may require a much higher level of expertise in the subject than someone who will only ever have to analyse the output data from the solution.

Example:

1. In the sample solution it has already been established that the Finance staff are experienced at computerised data entry. They do not however, have any specific experience in using Access databases which is the favoured application for this solution (see later exercises).
2. It is recommended then that all finance data entry staff undertake a basic Access course. This should cover the operational side of databases rather than design and construction.
3. As an option, it may be that managers should be able to make their own queries on the database, in which case they will need training on the necessary aspects of Access.
4. Casual staff should require no additional expertise as they will receive printed details of their pay from the application.

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Exercise 7 - Continued

5. Because you have heard that some of the casual staff have expressed concerns about how the new system will affect them, summarise the benefits of the new system (fewer errors, more information) and any potential drawbacks (standardised input, effects of computer failure) so that they will better informed.

Actions:

1. Create a new sub-heading of **Skills and Technology** in the **Specification** document.
2. Record any possible skills gaps for the example task with brief recommendations for further training. These can be based on the text in the **Example** section of this exercise.
3. Include a summary of the benefits and drawbacks of the new IT system for distribution to all staff involved.

*Note: Completing this section of the guide has allowed the following elements of the **Evidence Checklist** to be completed. In your checklist, the ticks must be replaced by the page numbers of your portfolio where the relevant evidence is located. This task may have to be delayed until the portfolio is complete and page numbers have been applied.*

1	Identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1e	identify and record the skills gaps and learning needs of the users of the solution	✓	<input type="checkbox"/>
1f	identify and record the benefits and drawbacks of technology and skills	✓	<input type="checkbox"/>

4. Save the document as **Specification** and leave it open.

Exercise 8 - IT Overview

Guidelines:

Although for the purposes of this qualification it is assumed that an IT solution will be implemented, we should be aware that in the real world the overall use of IT within an organisation would have to be considered before coming to any conclusions about solutions.

Within an organisation, there may be a variety of issues which affect people's attitude to IT. People who have never had exposure to IT systems can be wary of it because of unfamiliarity. People may distrust IT because they see it as intrusive and capable of monitoring their activity. People may favour IT solutions because they like the flexibility and the possibility of home working for example. Some see IT systems as environmentally friendly because they can reduce the use of paper for example, others could consider them environmentally unfriendly because of their reliance on electrical energy.

It is also important to know the current state of IT involvement within an organisation. How is it used at present? It would be easier and more successful to introduce a new IT system into a department or group of people who already have a strong commitment to IT. The same applies to the organisation overall. IT is such an integral part of all business systems today it is vital that its use is considered in any business plan or improvement strategy. Be aware of all such plans and strategies, they may have a bearing on any solution you may propose.

Organisations should be wary of developing IT systems just because they can. Improvements to systems can be important and bring benefits of efficiency and quality to the organisation but these benefits should be specifically identified before committing to development. Be aware of secondary effects. A new system that only requires an extra 3 computers on the network may result in an upgrade to the network server being required to be able to cope with the increased load.

The choice of solution may depend on factors other than just improving system performance. It may be the solution would be better achieved by changes outside of IT, in changing company procedures or structures for example. Even where there is a possible IT solution to a problem, it is not necessarily the most efficient solution, and indeed the costs of the required processes may far outweigh any benefits achieved. The analysis of cost against benefit should always be carefully considered. A super clever £1 million IT system that has minimal effect on an organisation's profitability may not be a good idea. While it seems obvious that such analysis is considered before starting development, particularly for large systems, sadly this is not always the case.

When planning possible IT solutions then, there is a large amount of data that can impact on the decision. It is not enough to have a 5 minute chat with the main user of the proposed system. Ensure that input is considered from all sources and that all possible information has been gathered. Make a checklist if necessary. Don't be the next person to have their expensive project abandoned half way through because they overlooked a vital piece of relevant information at the planning stage.

Exercise 9 - Evaluate Solution Options

Guidelines:

With the data from the previous exercises collected, it is now time to consider possible IT solutions for the project.

Assessment

Justify and record the choice and use of software tools and techniques.
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The solution options for a given task may involve different applications (spreadsheet or database, word processing or desktop publishing) or may involve different approaches using the same application.

The choice of solution will depend on many factors. Ease of implementation is one, and if time is a critical constraint then this may be the most important. Other factors such as user requirements and abilities may be more important in another situation. User requirements are usually the most important factors governing software choice after the practical constraints of time and/or resources.

Often the factors affecting the choice of solution will be conflicting. The solution that is easiest to implement may be the most technically difficult to operate. The solution that best satisfies all user requirements may involve resources that are impractical to provide.

A compromise is usually necessary. In any given situation the most important, deciding factor may vary, leading to different solutions.

There is probably no right or wrong answer when making the choice for this unit. What is more important is that the user should be able to justify it.

Example:

1. A simple IT solution to the sample project would be to extend the existing spreadsheet by 9 columns (7 days of the week, a total and a calculation of total multiplied by hourly rate). As data was received it could be entered into the appropriate cell in the grid. On Friday the calculation column would show the amount to pay.
2. This option involves the least IT development and is simple to operate. It does however involve the payroll staff in using a spreadsheet directly when they would rather use forms and does not make historical analysis easy.

continued over

Exercise 9 - Continued

3. A database solution could be used. The original spreadsheet could be imported to form the main table and a second linked table created to store the weekly hours worked data. A form could be created to enter the hours worked and a query or report would easily calculate the amount to be paid for any week.
4. This solution would involve the most development as it involves a new application (database) and a more complex solution. Once created however, the final system could be made easier to use by the use of entry forms and command buttons for reports, etc.
5. The solutions described above could all fulfil the main aims of the project (there may be others that would also be adequate) and now one must be selected.
6. In this example, the preferred choice will be the database solution.
7. The reporting function of database applications such as *Microsoft Access*, will allow standard forms to be designed and sent out so that payroll staff will be dealing with consistently formatted data, which is one of their stated preferences.
8. The forms design function within *Access* can be used so that data entry will be less technically demanding, which is another of the user preferences of the payroll staff. Data validation can also be built into the forms (using links to the data imported from the personnel spreadsheet) so that potential errors can be prevented at source.
9. Data can be entered as it is received. A single grouped report could be produced to give to staff with their pay to provide the necessary totals for each employee.
10. Reports can be produced in databases quite easily. A report with one person's data per page can be created and can then be distributed to the employees. More complex analysis reports can be produced for management purposes.
11. The versatility of the reporting function in a database application means that any reports which may be requested in the future should be achievable without too much effort.
12. Including a date or week number on the input data will make it relatively easy to produce historical analysis.
13. A database solution is more flexible than one based on spreadsheets, which should make the development of any future enhancements easier.

continued over

Exercise 9 - Continued

Actions:

1. Create a new sub-heading of **Solution Options** in the **Specification** document.
2. Record any possible IT solutions that were considered for the example task with a brief evaluation. These can be based on the text in the **Example** section of this exercise.
3. Record the preferred choice of IT solutions and the justification of that choice for the example task. These can also be based on the text in the **Example** section of this exercise.

*Note: Completing this section of the guide has allowed the following elements of the **Evidence Checklist** to be completed. In your checklist, the ticks must be replaced by the page numbers of your portfolio where the relevant evidence is located. This task may have to be delayed until the portfolio is complete and page numbers have been applied.*

1	Identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1g	justify and record the choice and use of software tools and techniques	✓	<input type="checkbox"/>

4. Save the document as **Specification** and leave it open.

Exercise 10 - Changes

Guidelines:

During the development cycle of the solution there may come a time when a change to the original specification becomes advisable or necessary in order to meet the requirements more fully.

One of the best ways to be made aware of any such changes is via the end user. They will have a better idea than most of which factors are increasing or decreasing the efficiency of the task. It is essential therefore to maintain contact with the end user throughout all stages of the development to ensure that such feedback is possible. It is equally important that any planned changes in the solution are communicated to the end user, to ensure their acceptance before proceeding.

Assessment

Identify and record changes that improve the efficiency of the task(s).
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Example:

1. In this example, it is noticed that instead of transferring staff data from the **Personnel** spreadsheet, it could be imported directly, or even better, the table could be linked directly to the original data. This would increase the efficiency of the system by saving data entry time and reducing the opportunity for error during the re-keying process.
2. This change however will require an update procedure to be run by the end users, the payroll staff and so it should be reported to them in case they can see any problems.

Actions:

1. Create a new sub-heading of **Changes** in the **Specification** document.
2. Record details of the proposed changes to the solution. Note that changes may arise at any stage of the development process, and this step could be completed as part of a later section of the task.
3. This represents the final part of the **Specification** document, it is now complete. Print out a copy of the whole document. This will become the first part of the submitted evidence portfolio for the unit.

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Exercise 10 - Continued

*Note: Completing this section of the guide has allowed the following elements of the **Evidence Checklist** to be completed. In your checklist, the ticks must be replaced by the page numbers of your portfolio where the relevant evidence is located. This task may have to be delayed until the portfolio is complete and page numbers have been applied.*

1	identify and produce a detailed specification of a document-based IT solution to a professional standard.	Page Number	
1h	identify and record changes that improve the efficiency of the task	✓	<input type="checkbox"/>
1i	produce a specification report including 1a-1h	✓	<input type="checkbox"/>

4. Save the document as **Specification** and close it.