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Title

Unit 52: Project Management

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UNIT 52:PROJECT MANAGEMENT

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Context

In this unit the student will learn how to assess needs requirements and evaluate options in order to implement and maintain a GIS laboratory and how to plan and manage GIS project work. The student will also learn where to find information on U.S. Government contracts that are available for bid.

Example Application

The city has hired you to establish a GIS based routing system for their 911 office. The system will be established from the ground up, there is no existing equipment or digital maps. There is a database of phone numbers linked to addresses. The city needs a system that will find the best route, display it on the monitor in a short period of time, produce written directions for the route, and print a hard copy. You will choose hardware/software, personnel, plan the project including deliverables.

Learning Outcomes

The following list describes the expected skills which students should master for each level of training, i.e. Awareness/Competency/Mastery.

[Awareness:](#)

[Competency:](#)

[Mastery:](#)

Awareness

Learning Objectives:

- The student will gain an understanding of the following:
 1. the steps involved in designing a functional GIS laboratory
! [Tip A1](#)
 2. maintaining a GIS laboratory
! [Tip A2](#)
 3. importance of getting a clear understanding of client specifications
! [Tip A3](#)
 4. what time and manpower budgets are
! [Tip A4](#)
 5. what is included in preparing bids
! [Tip A5](#)
 6. issues in defining deliverables
! [Tip A6](#)
 7. quality control methods
! [Tip A7](#)
 8. methods of scheduling
! [Tip A8](#)
 9. what is included in a package of deliverables
! [Tip A9](#)

Vocabulary

- needs assessment
- peripherals
- Request for Proposals (RFP)

Topics

1. Unit Tasks

1. Determine software needs by answering the following questions

! [Tip A10](#)

- do you need raster or vector functionality or both ?
- do you need image analysis capability ?
- will a desk top mapping package provide all the needed functions ?
- will the package handle the data formats you plan to use ?
- is the package capable of performing required analyses ?

- is the package supported (can you get assistance with problems) ?
- are staff trained to use the software, if not, what is the cost of training ?
- do you prefer workstation or PC based ?
- multi user or single user ?
- networked or stand alone ?
- does the system have sufficient disk space to store data and perform analysis ?
- is it compatible with the software and peripherals ?
- do you need digitizing/scanning capabilities ?
- do you need CD-ROM readers/writers ?
- do you need tape drives/zip drives ?
- what size and quality plots do you need to output ?
- what will you use for data backup/storage ?
- do you need additional staff persons ? If, so, what level of skill do you require ?
- do you need to budget for additional training ?

2. management

- Day to day management requirements:
 - monitoring disk space usage
 - backing up the system and storing backups off site
 - monitoring supplies
 - maintaining hardware as per vendor requirements
 - addressing security issues such as user management and software patches for security "holes"
 - keeping maintenance agreements current
- Long term management:
 - Upgrading software/operating systems to remain current
 - Upgrading hardware as demands increase
 - Assessing changing requirements and expanding facilities/equipment/personnel to meet the demands

3. determining client specifications

- what are the desired deliverables
- is speed of output important
- what is the desired format of output

4. To budget time and manpower, determine the following:

- what are the tasks to be performed
- what skills are required to perform the tasks
- who has the skills needed
- how long will it take each person to perform the task
- what is the cost of each person

- what is the available time frame for completing the tasks
- which person(s) is most cost effective to complete the task within the time frame
- are additional resources needed to do the work

5. In estimating the cost of a job, the following need to be considered:

- personnel required to do the job
- man hours for each person
- hourly cost of each person
- management hours and cost
- travel if required
- meetings with the client
- cost of equipment and supplies
- company overhead

6. Defining deliverables

- develop an outline of the deliverables to your client including information required in the database in order to obtain the desired output products

7. Quality control methods

- draft a plan for quality control, how will you validate your database ?

8. Scheduling

- draft an outline of the lifecycle of the project. What is the sequence of events from beginning to packaging of the product ?

9. Packaging deliverables

- define the packaging of the product.

Competency

Learning Objectives:

The student will:

1. find information on hardware/software
2. match client specifications to hardware/software capabilities
3. determine the level of skill/training needed to perform the tasks with the software/hardware products

4. match skill level to various projects tasks
5. calculate cost based on tasks and skill level required
6. determine whether the options you are evaluating will enable you to deliver a good product
7. evaluate the QC process using hardware/software options
8. estimate time for each part of the project.
9. list hardware/software/supplies needed in order to package the product properly

Generic List of Tasks:

1. search the world wide web for vendor sites and gather product specifications. Contact vendors for additional information.
2. evaluate support functions of vendors. Is there phone/e-mail support (help desk)? Is there a service representative in the area? What is the expected response/turn around time on repairs? What is the cost of the services?
3. Compare the client specifications to the capabilities of the hardware/software. Which options will perform the needed tasks?
4. Outline the skills needed in order to complete the tasks. Find out the cost of software training courses from vendors.
5. Estimate hours required to complete project tasks. Assign a salary level to the various tasks based on skill level required.
6. Review the deliverables based on the vendor specifications.
7. have you considered having the capability to plot on mylar? Did you consider a light table for viewing overlays?
8. create a flow chart with tasks and time for each.
9. determine what you need to deliver the product in the desired format. CDROM writer? Plotter capable of the size plots desired ?

Mastery

Learning Objectives:

In finalizing a plan for the E911 project, the student will:

1. Select what is needed for the project.
2. Understand lab management tasks.

3. Be able to educate the client in order to get clear specifications.
4. Understand the steps in determining time and manpower budgets.
5. Know how to prepare a bid.
6. Clearly define deliverables
7. Develop QC methods
8. Understand project flow and scheduling
9. Define contents of the delivery package

Mastery tasks:

1. Select a software package, platform and peripherals explain why you chose them.
2. Develop a list of lab management tasks.
3. Determine exact client specifications.
4. List personnel required and man hours for each.
5. Give a cost of your project.
6. List exact deliverables.

 [Tip M1](#)

7. List your QC methods for the project.

 [Tip M2](#)

8. Develop a schedule of project tasks.
9. Define what will be included in your package of deliverables.

 [Tip M3](#)

 [Example Implementation](#)

Resources

[Outdated link has been removed.]

- <http://www.esri.com>
- <http://www.mapinfo.com>
- <http://www.erdas.com>

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! Tip A1

The initial step in equipping a GIS lab is to conduct a needs assessment. In this assessment you will determine hardware/software/staff requirements and develop a plan based on project requirements and within the constraints of your budget. A careful assessment of available resources is critical to acquiring the functionality necessary in the lab. Your budget may not allow for top of the line software packages, large bed plotters, and highly skilled personnel. It is sometimes more cost effective to have parts of the work done out of house, for example, occasional color printing of large plots, rather than purchase and maintain an expensive large bed color printer.

! Tip A2

Once it is established, the GIS lab requires careful maintenance. Downtime is expensive, and loss of data can be catastrophic. Maintenance agreements with software/hardware vendors are critical in assuring quick resolution of problems such as failed equipment. A lab manager who is skilled in system administration is crucial to keeping the lab running smoothly. A backup system must be implemented to prevent loss of data. Backup processes can be automated and backups should be stored in a secure location away from the GIS lab. Security issues, such as user management on multi user platforms and security "holes" on networked systems require constant monitoring and resolution.

! Tip A3

Having a clear and complete understanding of the desired deliverables is critical in project planning. Misunderstandings of the exact specifications can result in redoing work and increased cost of the project at your companies expense. The client may not be familiar with GIS technology and the types of output you can deliver. Thus, educating the client is often a part of the process of determining specifications. The GIS person who will be doing the actual project work should be included in discussions of specifications so that he/she has a better understanding of the work to be done. You must have a good understanding of the capabilities of your available software/hardware to determine whether you can produce what the client wants. It is advisable to put the specifications in writing and have the client review and approve them before beginning work. [More on defining deliverables](#)

! Tip A4

Budgeting time and manpower requires knowledge of the levels of expertise required by the project and available from your staff members as well as the scope of the project and the time frame for completing it. Matching tasks with the persons most skilled to perform them will speed up the project, however, the person with the highest level of expertise may cost more. It

is important to balance cost and time and provide a quality product for a competitive price. The budgeting becomes easier over time as you become more familiar with the productivity and abilities of your staff members. Tracking actual times and comparing them with estimated times will refine the process.

! Tip A5

A request for proposals (RFP) may be available from the prospective client which gives information on the work to be done. Information on and listings of U.S. government RFPs can be found in the Commerce Business Daily publication [*outdated link removed*].

The website also includes instructions on responding to RFPs. A successful proposal in response to the RFP will address all requirements of the RFP, list only the information requested to be submitted, and follow the guidelines for format and content completely. In the absence of an RFP, you will need to get information from the client as to what the job consists of. Failure to follow guidelines can result in your bid not being considered. Information from time and manpower budgets is used in preparing a bid on a job. It is critical that the bid covers the cost of completing the job using available resources at the lowest reasonable cost. Underbidding a job can result in much difficulty in completing the work within a too limited budget.

! Tip A6

If the deliverables are hard copy plots the following should be determined:

- information to be included on the plot
- size
- scale
- color or black & white
- color scheme
- font type/size
- symbology
- placement of labels
- legend
- layout
- margin requirements
- map projection
- level of accuracy required

Showing the client examples of plots can assist in making the decisions. Preparing an example plot and getting the clients approval before continuing the project is also advisable.

If the deliverables are digital data bases you will need to address the following:

- software compatibilities
 - information to be included in the database
 - format
 - structure
 - method of transfer (tape, diskettes, CD-ROM ?)
-

! Tip A7

Quality control procedures help insure a good product, and should be followed throughout the entire project process. A critical component of the QC process is ongoing documentation during the planning and project production process. Doing this is a tedious, but necessary process. Steps to complete the project are determined in the planning stages. Documentation during production will determine whether any variance from the initial plan was made.

After completion of the project:

- documentation should be reviewed for errors and variance from the initial plan
 - visually check the database for errors and omissions (GIS databases can be huge, and only spot checking may be feasible) print out check plots and compare with input data
 - display data layers on the monitor and visually check for accuracy
 - calculate area and compare to what it should be
 - compare your findings to another source, for example, if you have mapped cropl and, calculate the acreage of cropland in your database and compare it to acres of cropland in an agricultural atlas.
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! Tip A8

Time and manpower budget information can be utilized to schedule a project. Hours allocated for each staff person working on the project have already been determined, along with the tasks and sequence in which they should be performed. Considerations are scheduling the tasks so that they will be completed within the required time frame and that other project work, if any, is also being done on schedule. To insure that work is on schedule, frequent progress reports and interaction with workers are important here. You will need to address any problems and resolve them quickly to insure the project does not fall behind schedule. To facilitate the process:

- communicate to each worker exactly what their job assignment is and the time frame allocated
 - insist that any problems be immediately reported to the project manager
 - request weekly progress reports including information on whether the work is proceeding on schedule
 - address problems that are delaying the schedule immediately
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! Tip A9

Once the project is completed, and has gone through the QC process, it is ready to be packaged for delivery. Digital deliverables should be put onto a media that is compatible with the customer's system, for example, diskettes, tape or CD-ROM. Verify media requirements with the customer and label the media with contents and instructions on how to access the data. Check that the data can be accessed from the media. Make a backup copy for your records and keep it in a safe place.

Documentation validates and qualifies your work and must be included as part of the project deliverables. Documentation should include:

- contents of the deliverable and description (projection, scale, etc.)
- description of source data
- description of processes used on the source data (reprojection, rubbersheeting, etc.)
- description of analysis done, if any
- list of any errors found in the source data
- date of project
- who did the project (company, names)
- instructions for accessing/using the data

After delivery, follow up with the customer to confirm that the deliverable was satisfactory.

! Tip A10

GIS software packages are available with a wide range of functions from very powerful, such as ARC/INFO, to more user friendly but less powerful desk top mapping packages. They range in cost from free (GRASS) to very expensive (ARC/INFO). It is important to select a package that has all the functions you need to perform. Software vendors can educate you on the functionality of their products. The platform and operating system you choose needs to be compatible with the software packages you plan to use as well as with the user environment. Options range from stand alone PC's to multi user network based workstations/servers. You will also need to assess disk space requirements, input/output device needs, and security requirements including backup devices. Communication with vendors will assist you in selecting functional and compatible software and hardware.

! Tip M1

For example, a database of geocoded addresses for all residents of the city in ArcView 3.0 for use with Arc View with Network Analyst extension.

 Tip M2

Plot out road network on mylar and overlay with other source of street map data.

 Tip M3

Documentation (including source of data, who created the database and date of creation, methods used to create the database, along with instructions on using the database) and data on what media?



Example Implementation

For the E991 project, I would select PC based ArcView 3.0 software with network analyst extension. This software provides the capability of choosing the best route and printing the directions and a hard copy map in a very short time. The project would need staff experienced with Arc View and Network analyst to create the database. I would check the database visually for errors and use check plots to verify with other hard copy maps.
