Final

Project

Report

Emanon College Lab Build Project

|  |  |
| --- | --- |
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| Date: | 14 Aug 2009 |

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# Project Overview

## Background

Emanon College’s strategic direction is to promote itself as a top-tier, state-of-the-art business and technical college. There has been a significant shift in the need to use computer systems, even in non-technical subject areas. Before the project, there were only five computer labs on campus, with a total of 100 workstations that were all more than five years old. These labs were being used 14 hours per day; some classes had two students per system, and the Fall term increased course offerings that required extensive use of computer lab facilities.

## Need/Requirement

The college did not have sufficient computer lab space to handle the increased demand, and the systems in the labs were rapidly becoming obsolete. A feasibility study was conducted to determine the computer lab needs of the college in more measurable terms. The result of this study was a recommendation to undertake a project to double the number of computer labs and computers in the college, and update all of the lab equipment to current technology.

## Objectives

The objective of this project was to build ten computer labs at Emanon College to increase the lab capacity by 100% and equip the labs with technology that is no more than one year old before Fall classes started this year. This objective was achieved on 15 August 2009.

# Project Scope

## Deliverables

### Deliverable 1: Project Documentation

#### Description:

Project administration documentation included the project plan, project reports, quality control and assurance documents, change control documents, project closing documents, and other project information.

#### Acceptance Criteria:

For project documentation to be acceptable, all specifications had to be met. This deliverable was accepted on 14 August 2009.

### Deliverable 2: Lab Design Documents

#### Description

#### The design documents are comprehensive room drawings and specifications for all computer labs. They include detailed, scaled information on all labs, including all furniture, equipment, and hardware in each room, furniture specifications, equipment specifications including software, layout/floor plan of the room, and construction specifications.

#### Acceptance Criteria

For the design documents to be acceptable, all specifications had to be met, and the following criteria also needed to be achieved:

* Each room have its own package of design drawings, and files.
* All drawings include the scale, drafter, designer, building, room number, symbols, and other key information to provide the user with exact information to be able to follow the drawing to build the facility.
* All construction specifications must meet generally accepted engineering standards as defined in the Project Resource Manual produced by the Construction Specifications Institute.

This deliverable was accepted on 26 June 2009.

### Deliverable 3: Ten Computer Labs

#### Description

The primary deliverable of this project is ten new computer labs. Each of these labs include student workstations, at least one instructor workstation, at least one digital projector and screen, and at least one workstation to accommodate students with special needs.

#### Acceptance Criteria

For each computer lab to be acceptable, all specifications in its design documents had to be met. This deliverable was accepted on 7 August 2009.

### Deliverable 4: Lab Maintenance Documents

#### Description

The lab maintenance documents are complete as-built documents and preventative and corrective maintenance procedures for all computer labs. They include detailed drawings and specifications that reflect the actual facility conditions after completion.

#### Acceptance Criteria

For the maintenance documents to be acceptable, all specifications had to be met, and the following criteria also had to be achieved:

* Each room will have its own package of maintenance documents.
* All construction specifications must have met generally accepted engineering standards as defined in the Project Resource Manual produced by the Construction Specifications Institute.
* Hard copy of all drawings, CD disk containing digital documents complying with requirements detailed above.
* A minimum of two (2) printed & bound sets of all maintenance manuals and one (1) set in digital form are provided.

This deliverable was completed on 6 August 2009.

## Scope Exclusions:

The following deliverables and tasks were excluded from the project:

| Excluded from project: | Reason: |
| --- | --- |
| Developing and administering a college computer usage policy were out of scope for this project. | It is a function of the operations of the Information Systems (IS) Department |
| Software licensing was out of scope for this project. | The IS department procures enterprise licenses for most software, and faculty-specific software is managed through IS. Loading the software on the systems was the responsibility of IS and it was done during installation of the computers in each lab. |
| Disposal of old furniture and equipment was out of scope for this project. | It is a function of the operations of the Facilities Department. The Facilities Department removed the old equipment and furniture from the existing labs, and the project team performed the demolition required for the project. |
| Promotion and communication of the new facilities was out of scope for this project. | It is the responsibility of the college administration. |

## Detailed Assumptions

| It was assumed that: | This was validated by: |
| --- | --- |
| * the existing lab rooms had the electrical, cooling, and network capacity for the new lab equipment. | * conducting a site review during development of the design specifications for each lab. The existing labs had sufficient capacity |
| * the existing labs had security systems installed. | * conducting a site review during development of the design specifications for each lab. New security systems were installed for all labs. |

## Constraints

The following restrictions applied to the project:

| Constraint imposed on project: | Reason: |
| --- | --- |
| The labs had to be operational before August 15th, 2009. | Because classes began in the labs the following week, and instructors needed time to familiarize with the spaces. |
| The project must only use approved vendors in accordance with the college’s procurement policies and standards. | Because the college must comply with all government procurement and competition regulations. All vendors were approved. |
| The lab construction work could not start until after July 1st, 2009. | Because classes were in the rooms until the end of June. |

## Project Approach/Phases

The project was conducted in three major phases:

1. Design – the overall lab requirements were analysed and the labs were designed.
2. Construction – the labs were built.
3. Commissioning – the labs were tested and operations and maintenance procedures were established.

## High Level Tasks:

|  |  |  |  |
| --- | --- | --- | --- |
| Phase or Summary Task | Baseline Work | Actual Work | Work Variance |
| **Lab Build Project - Sample** | **2,864h** | **2,918h** | **54 h** |
| Project Management | 792h | 714h | -78h |
| Design | 808h | 940h | 132h |
| **Construction** | **1,040h** | **1,040h** | **0h** |
| Borlaug Building | 208h | 208h | 0h |
| Marquez Library | 208h | 208h | 0h |
| Salam Center | 320h | 320h | 0h |
| Sen Building | 304h | 304h | 0h |
| Commissioning | 224h | 224h | 0h |

+’ve variance = more work performed

-’ve variance = less work performed

Design required 132 hours more work because the original estimates did not consider the full scope of the design requirements.

# Project Resources

## Labour

The following resources were required to complete this project:

|  |  |  |  |
| --- | --- | --- | --- |
| Personnel | Baseline Work | Actual Work | Work Variance |
| Project Manager | 368h | 336.27h | -31.73h |
| Information Systems Director | 208h | 199.6h | -8.4h |
| Facilities Director | 0h | 66.15h | 66.15h |
| Facilities Manager | 168h | 60h | -108h |
| Procurement Manager | 112h | 104.07h | -7.93h |
| Interior Designer | 240h | 384h | 144h |
| Architect | 216h | 216h | 0h |
| Mechanical Consultant | 128h | 128h | 0h |
| Electrical Consultant | 128h | 128h | 0h |
| Security Consultant | 88h | 88h | 0h |
| Communications Consultant | 128h | 128h | 0h |
| General Contractor | 1,080h | 1,080h | 0h |

+’ve variance = more work performed

-’ve variance = less work performed

The Facilities Manager performed less work than planned because he was removed from the project on 28 June 2009. He was replaced by the Facilities Director, and less overall work was required.

## Material

|  |  |  |  |
| --- | --- | --- | --- |
| Material | Baseline Amount | Actual Amount | Amount Variance |
| Chairs | 260 chairs | 260 chairs | 0 chairs |
| Student workstations | 250 desks | 250 desks | 0 desks |
| Instructor workstations | 10 desks | 10 desks | 0 desks |
| Whiteboards | 40 boards | 40 boards | 0 boards |
| Screens | 20 units | 20 units | 0 units |
| Tables | 20 tables | 20 tables | 0 tables |
| Projectors | 20 units | 20 units | 0 units |
| PC systems | 239 PCs | 239 PCs | 0 PCs |
| Displays | 239 monitors | 239 monitors | 0 monitors |
| Mac systems | 21 Macs | 21 Macs | 0 Macs |
| Scanners | 10 scanners | 10 scanners | 0 scanners |
| Printers | 10 printers | 10 printers | 0 printers |

+’ve variance = more units used

-’ve variance = fewer units used

# Project Schedule

## Schedule

The project started on 5 January 2009 and it was completed in 7.5 months on 14 August 2009, two weeks ahead of schedule.



Grey: Baseline plan

Black: Actual schedule

|  |  |  |  |
| --- | --- | --- | --- |
| Summary Task | Actual  Duration | Actual  Start Date | Actual  Finish Date |
| **Lab Build Project** | **156d** | **Jan 5 '09** | **Aug 14 '09** |
| Project Management | 156d | Jan 5 '09 | Aug 14 '09 |
| Design | 73d | Mar 16 '09 | Jun 26 '09 |
| **Construction** | **21d** | **Jul 6 '09** | **Aug 4 '09** |
| Borlaug Building | 13d | Jul 6 '09 | Jul 22 '09 |
| Marquez Library | 13d | Jul 6 '09 | Jul 22 '09 |
| Salam Center | 21d | Jul 6 '09 | Aug 4 '09 |
| Sen Building | 20d | Jul 6 '09 | Jul 31 '09 |
| Commissioning | 28d | Jun 26 '09 | Aug 7 '09 |

## Key Project Milestones



|  |  |  |  |
| --- | --- | --- | --- |
| Milestone | Baseline Date | Actual Date | Finish Variance |
| Project approved | Jan 5 '09 | Jan 5 '09 | 0d |
| Project plan approved | Feb 27 '09 | Mar 27 '09 | 19d |
| Lab requirements complete | Mar 13 '09 | Apr 3 '09 | 15d |
| Construction documents complete | Apr 20 '09 | Jun 5 '09 | 33d |
| Designs complete | May 4 '09 | Jun 26 '09 | 38d |
| Operations manuals complete | May 19 '09 | Aug 6 '09 | 55d |
| Lab construction started | Jul 6 '09 | Jul 6 '09 | 0d |
| Labs complete | Aug 7 '09 | Aug 7 '09 | 0d |
| Project complete | Aug 28 '09 | Aug 14 '09 | -10d |

+’ve variance = behind schedule

-’ve variance = ahead of schedule

Most of the design milestones were behind schedule due to the amount of slack on the tasks, and because there were delays caused by one of the team members.

Operations manuals were completed two months behind schedule. They were not started when planned, because these tasks had a lot of slack, but they were completed within the available slack.

The overall project was completed ten days ahead of the originally scheduled date, because of a request from the sponsor to complete before August 15, 2009.

# Project Budget

The project was completed within the overall budget. The total budget for this project was $1,665,000. This included a 10% contingency reserve amount and only reflected the direct costs associated with this project. The actual cost of the project was $1,529,000. $15,000 of contingency was used and the remaining $136,000 of contingency was returned.

## Task Expense Statement

The following is a breakdown of the costs on this project by project phase including labour and material costs and contingency reserves:

|  |  |  |  |
| --- | --- | --- | --- |
| Summary Task | Baseline Cost | Actual Cost | Cost Variance |
| Project Management | $38,080 | $35,761 | $2,319 |
| Design | $101,120 | $117,960 | ($16,840) |
| Construction |  |  |  |
| Borlaug Building | $271,400 | $271,400 | $0 |
| Marquez Library | $271,400 | $271,400 | $0 |
| Salam Center | $407,100 | $407,100 | $0 |
| Sen Building | $407,100 | $407,100 | $0 |
| Commissioning | $17,600 | $18,000 | ($400) |
| **Sub-total** | **$1,513,800** | **$1,528,721** | ($14,921) |
| Contingency | $151,200 | $136,279 | Amount returned |
| **Total** | **$1,665,000** | **$1,665,000** |  |

+’ve variance: under budget

–’ve variance: over budget



## Resource Expense Statement

The following table and chart represent the project costs by resource type:

|  |  |  |  |
| --- | --- | --- | --- |
| Resource Group | Baseline Cost | Actual Cost | Cost Variance |
| Administration | $29,600 | $27,321 | $2,279 |
| Design | $127,200 | $144,400 | ($17,200) |
| Equipment | $958,000 | $958,000 | $0 |
| Furniture | $199,000 | $199,000 | $0 |
| General Contractor | $200,000 | $200,000 | $0 |
| **Sub-total** | **$1,513,800** | **$1,528,721** | ($14,921) |
| Contingency | $151,200 | $136,279 | Amount returned |
| **Total** | **$1,665,000** | **$1,665,000** |  |

+’ve variance: under budget

–’ve variance: over budget



## 

## Project Cash Flow Projection

The following table and chart represent the actual project expenses over time.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Tasks** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** |
| Project Management | $3,788 | $17,388 | $1,288 | $2,002 | $1,907 | $1,685 | $2,066 | $5,638 |
| Design |  |  | $14,912 | $26,061 | $56,861 | $20,126 |  |  |
| Construction |  |  |  |  |  |  | $1,353,000 | $4,000 |
| Commissioning |  |  |  |  |  | $160 | $15,327 | $2,513 |
| **Sub-total** | **$3,788** | **$17,388** | **$16,200** | **$28,064** | **$58,768** | **$21,971** | **$1,370,393** | **$12,151** |
| Cumulative total | $3,788 | $21,176 | $37,376 | $65,440 | $124,207 | $146,178 | $1,516,571 | $1,528,721 |
| **Total with contingency** | **$1,665,000** | **$1,665,000** | **$1,665,000** | **$1,665,000** | **$1,665,000** | **$1,665,000** | **$1,665,000** | **$1,665,000** |



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# Project Risk Management

## Risk Register

There were no major risk occurrences during this project.

# Major Project Changes

## Approved Changes

Just before construction of the labs commenced, the project sponsor requested and approved a change to the schedule to complete the project two weeks earlier, by August 15, 2009. The change did not significantly affect the baseline schedule, and therefore the change was controlled informally by accelerating the schedule. The final approval and acceptance of the project on August 14, 2009 constitutes approval of this change.