

Systems Proposal for Computerized Project Tracking System

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Abstract

A detailed system study was undertaken to look into current problems and limitations of the Training and Managements Department's project tracking systems. It was found that the Training Unit's Project Tracking System (PSRS) lacks essential features, is outdated and frustrating to users as well as management. The current system restricts MRE's ability to meet its organizational objectives. A cultural environment consisting of two conflicting subcultures was found and will cause problems when implementing a new system unless these conflicts are resolved. I recommend extending the project tracking system developed by the Systems Unit, Global Engineering Management Systems (GEMS), to a full web based solution with additional functions requested by the Training Unit. This system will allow on demand access for all stakeholders worldwide 24x7 and will resolve problems currently associated with the PSRS. Management should first create a unified culture, which will enthusiastically nurture a system change, before implementing changes to the GEMS.

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1 Outline of Systems Study

In order to determine the extent of the Training and Management Systems current problems and limitations, I interviewed key members of MRE, examined company documents, studied the results of a questionnaire based survey, explored the MRE Web site <http://www.prenhall.com/kendall/html/hyper/index.htm>, and performed an in-depth system study.

1.1 Interviewing and Observations of Staff

Systematic interviews of MRE staff were performed to better understand the current system and discover opportunities for improvement. The sample of interviewees was purposively chosen to include all the key members of departments directly related to the project management system.

Senior Management,

- Jimmy Hyatt - President
- Warren F. Torrey - President and Chief Executive Officer
- Linda Lin - Assistant Vice President
- Daniel Hill - Vice President - Engineering Systems Division

Training and Managements Department,

- Snowden Evans - Director
- Thomas Ketcham - Manager - Training Unit
- John Sherman - Administrative Assistant - Training Unit
- Kathy Blandford - Client Analyst - Training Unit
- Melissa Smith - Manager - Management Information Systems Unit
- Todd Taylor - Systems Analyst - Management Information Systems Unit

Facilities Department

- Barry Matias - Director
- Roger Rabin - Systems Programmer

To supplement the interviews; observations of people, offices and interactions were also systematically carried out.

1.2 Questionnaire

A questionnaire was conducted to determine the training unit's opinion of the current project tracking system, general computer ability, and the impetus for change. A complex random sample, stratified for staff member position was performed. A sample size of 30 unit members, the majority from general staff, was chosen. Questions were grouped into the following 3 broad categories,

- information about the members and their skills
- opinions of the current project tracking system
- what should be done to improve the system

1.3 GEMS Prototype

The Systems Unit is currently building a computerized project tracking system called GEMS. A semi-functional prototype is located in Snowden Evans office. Experimentation was carried out on the prototype to determine its technical feasibility and set of features.

2 Detailed Results of Systems Study

2.1 Results of Interviewing and Observations

2.1.1 Organizational Culture

The interviews and observations revealed a politically charged organizational culture. There is a significant "us against them" attitude between the Training unit and the Management Information Systems Unit. Although progress is being made to integrate the two units, such as regular meetings and an open-door policy for complaints, it is having a serious impact on the Training and Managements Department's performance. The conflict arises from the different working practices and environment of the unit members. Systems Unit being seen as structured and team orientated, whereas the Training Unit is considered creative and independent. This culture will have a negative impact on the operational feasibility of any new system. A culture more accepting to the new system should be solidified before implementation is attempted.

Although the PSRS has been demonstrated as clearly inefficient, Training Unit management appear unenthusiastic about change. Without the support of management it will be difficult to bring the Training Unit staff on board.

The security of any new system may be an issue for the Training Unit as they share ideas freely and may not accept the limitations imposed upon them. Therefore, any security system should be as transparent and simple as possible.

2.1.2 PSRS

The Project Service Reporting System (PSRS) used by the Training Unit is contributing serious problems to the organization. It is outdated, inefficient, lacking essential security features and project management

functions. Reports are generated manually as paper memorandums, which frustrates top management. The problems of PSRS may be summarized as follows,

- Lack of effective tracking and data integrity features
- Reports do not provide all necessary features and are not available on demand
- Data can not be entered into the system on demand
- Input forms are not processed into the system quickly
- Instructors must return to the office to enter there data

These problems are hindering the company's progress expanding into new markets and remaining competitive.

2.1.3 Incompatibility of GEMS with Training Department

GEMS has been designed to operate on IBM computers, since this is what hardware the Systems Unit uses. However the Training Unit uses Macintosh computers, therefore making GEMS incompatible. According to Training Unit members, GEMS does not have the required functions to meet the business and training requirements of the unit's educational and training programs. If the GEMS system is to be expanded for use by the Training Unit then these two issues must be addressed.

2.2 Results of Questionnaire

From the results of the questionnaire we can infer that the members of Training Unit in general,

- Are at most semi-sufficient at using a computer
- See the current project tracking system as informal and in need of improvement
- Think partial modification and improvement is the solution
- Are not enthusiastic about a computerized tracking system

However the survey also indicates that almost 50% have never heard of a *computerized* project tracking system. This suggests that half of the training unit do not understand the benefits that a computerized system will give them.

2.3 Results from GEMS Prototype

Even though the GEMS prototype is semi-functional and lacks the supporting organizational procedures, it clearly demonstrates the technical feasibility of the computerized system. The system addresses all the features lacking or missing from the PSRS, most notably input and output on demand.

2.4 Opportunities for Improvement

To summarize, there is opportunity for improvement in the following areas,

- Organizational culture of the Training and Managements Department
- Computer ability of the Training Unit
- GEMS compatibility for Macintosh systems
- Addition of functions to GEMS to meet the requirements of the Training Unit

3 System Alternatives

directly address the mentioned problems

We will present two alternative system solutions for consideration,

- Modification of GEMS
- Retain PSRS

3.1 System Alternative 1 - Modification of GEMS

We propose extending GEMS to provide the following benefits to MRE,

1. Meet the Training Unit's requirements of additional functionality
2. Resolve the current incompatibility between the Training Unit's Macintosh computers and the GEMS
3. Accessibility of the system from any computer which is part of the Internet.
4. A common platform for all employees of Engineering Systems Division

By extending the systems interface to a full web-based solution, requirements (2) and (3) could be resolved. Using a full web based solution will allow access from any computer with sufficient authorization using a standard web browser. Authorization could be enforced through standard networking security techniques. A username password pair is allocated to all persons authorized for access. Each user is then only granted access to features and data relevant to their position within the organization.

The additional functionality that the Training Unit requires should be relatively simple to add to the GEMS system. However, creating a positive organizational culture will not be so simple. Getting the Training Unit's management to enthusiastically accept the new system will be crucial to swaying the Training Unit's staff. This may require the removal of some members of management.

The GEMS system will be as intuitive to use as possible and so the level of computer literacy will simply be the ability to use an Internet browser and basic computer skills. With daily use of GEMS, the Training Unit's computer skills should be raised to an adequate level over time. More skilled members of the Training Unit should help those less skilled as difficulties arise. If this form of training is inadequate, and some staff members are still having difficulty then personal training with a member from Systems Unit could be arranged.

3.1.1 Costs

The following is a breakdown of the costs attributed to this solution,

- **Assumptions:** See Table (1).

Cost	Title
\$90/hr	Software Developer
\$40/hr	Tester
\$60/hr	Network Administrator
\$120/hr	Linux Expert
\$10/pull	CAT-5 Cable Pull

Table 1: Cost assumptions

- **Software:** Developers to extend GEMS to a full web based interface and adding the extra functionality requested by the Training Unit. See Table (2) for cost and time breakdown.

Cost	Time	Description
\$30600 (\$90/hr)	2 person-months	Modification and connection to middleware
\$1600 (\$40/hr)	1 person-week	Testing
\$32200	9 person-weeks	Total

Table 2: Cost and time breakdown of Software development

- **Middleware:** Develop a Java based solution for connectivity between the GEMS web interface to the existing mainframe database system. This will involve J2EE and CORBA type technologies. An opensource application server server, JBoss, will be used to minimize setup and licensing costs. See Table (3) for cost and time breakdown.

Cost	Time	Description
\$15300 (\$90/hr)	1 person-months	Develop and deploy middleware solution
\$1600 (\$40/hr)	1 person-week	Testing
\$16900	5 person-weeks	Total

Table 3: Cost and time breakdown of Middleware development

- **Hardware:** A server shall be purchased to host the new GEMS web application and middleware application server. Opensource technologies will again be used to minimize licensing fees. The secure operating system Linux will be used to host a JBoss application server which will also act as a web server for the GEMS web interface. Linux can and will be made as secure as is possible. See Table (4) for cost and time breakdown.

Cost	Time	Description
\$2880 (\$120/hr)	3 person-days	Install and configure Linux system
\$3500	-	Server
\$6380	3 person-days	Total

Table 4: Cost and time breakdown of system hardware

- **Networking:** Networking for all Training Unit computers will be made. Since there are 35 members of the Training Unit, there will need to be 35 cat-5 cables pulled from the organization intranet network switch to each Macintosh computer. The computers will be secured and inserted into the organization intranet by the network developer. See Table (5) for cost and time breakdown.

Cost	Time	Description
\$350 (\$10/pull)	3 person-days	Cabling
\$1440 (\$60/hr)	na	Network configuration
\$1790	3 person-days	Total

Table 5: Cost and time breakdown of networking

Thus, a total cost of $\$32200 + \$16900 + \$6380 + \$1790 = \mathbf{\$57270}$

3.1.2 Benefits

This solution will provide the following benefits to MRE,

- Platform independence. System will be accessible from Macintosh, IBM, and any other platform
- Large Accessibility. Instructors who are off site can enter their information without the need to drive back to work. Employees and management can access the system 24x7 from anywhere in the world
- Instant access to reports. Executives can easily login anytime to access the reports they need
- Integration of the systems used by the Training and Systems Units by providing a uniform framework
- Make use of the existing web servers that MRE is using to host its Internet web site
- Departmental intranet will satisfy requirement (4)

3.1.3 Analysis

This system provides a cost effective way to provide significant benefits to MRE.

3.2 System Alternative 2 - Remain with PSRS

A second proposed system would be to continue using the PSRS. However, this would not rectify any of the problems currently faced by the Engineering Systems Division. If these problems are not resolved, MRE's efficiency will stagnate and it will be impossible to achieve the growth and expansion required.

4 System Analyst Recommendations

I recommend the implementation of solution 1 - Modification of GEMS. It will provide the foundation that MRE requires to meet its organizational goals and future workload. The full web based solution will

give all stakeholders on demand access from anywhere in the world 24x7. It will provide an integrated uniform departmental system and hence reduce the complexity of tracking large scale mission critical projects.

5 Proposal Summary

The detailed system study into the problems and limitations of the project tracking capabilities of the Training and Managements Department revealed an outdated system lacking in essential features and frequently a frustration to users as well as management. The current system is restricting MRE's ability to meet its organizational objectives. A cultural environment consisting of two conflicting subcultures of the Training and Managements Department was found and will cause problems when implementing a new system unless these conflicts are resolved. I recommend extending the project tracking system developed by the Systems Unit, Global Engineering Management Systems (GEMS), to a full web based solution with additional functions requested by the Training Unit. This system will allow on demand access for all stakeholders worldwide 24x7 and will resolve problems currently associated with the PSRS. By utilizing opensource technologies the licensing fees and initial cost will be minimized. The project is technically feasible as demonstrated by a working prototype and my recommendation cannot be stressed enough. However Management should first create a unified culture, which will nurture any system change, before attempting changes to the GEMS. With a new project tracking system MRE will have the solid foundation required to tackle its current and future objectives.

6 Appendices

6.1 Questionnaire

MEMORANDUM

TO: Snowden Evans

FROM: Roger

RE: Results of Survey

n = 30

1. My position in the Training Unit is:

Supervisor 2

Staff 21

Consultant 2

Physician 5

2. Number of months and years with MRE:

Median = 6 Mean = 6.2

3. I would describe my computer skills as:

Non-existent 1

Beginner 10

Semi-proficient with some computer tools and systems 12

Very proficient with some computer tools and systems 5

Very proficient with numerous computer tools and systems 2

4. Concerning my computer systems skills, I would:

Be very interested in gaining more skills in many tools and systems 8

Have some interest in gaining more skills in certain tools and systems 18

Be satisfied with my present level of skill 4

5. My unit's current system for monitoring project progress and creating management reports could best be described as:

Non-existent 5

Very informal 8

Semi-structured 14

A formal Project Tracking System 3

6. My opinion of the usefulness of the present project tracking system could be described as:

Mean = 2.4

7. My opinion of the need for improvements in the present project reporting system could be described as:

Mean = 3.2

8. I feel the following changes (if any) need to be made in the present project reporting system:

Complete re-structure 1

Extensive modification to present structure 4

Partial modification 17

Slight improvements and modifications 8

9. My experience with computerized project tracking systems could be described as:

Not familiar 14

Heard of them 8

Seen them 6

Used one briefly 2

Used one regularly 0

10. My desire to learn more about computerized project tracking systems could be described as:

Mean = 2.4

11. With respect to my work, I feel the the usefulness of a computerized project tracking system could be described as:

Mean = 2.2