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Report:

Tactical planning: improving performance for information technology (IT) groups creating digital projects

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Good planning and communication are crucial to the digitization process. The originators of project proposals and donors who finance the work are often not technically sophisticated. They may have vastly different expectations of the complexity of the work, what are technically feasible and realistic time frames to achieve acceptable results than does the technical staff that carries out the work. In addition, managers may compete for resources (personnel and scheduling priority) for their projects. This can lead to stress, misunderstandings, and lowered technical staff morale. At Carnegie Mellon University Libraries, we developed a tactical planning system that mitigated these problems, improved interpersonal relationships and expedited the digitization process.

1 Background

Library Information Technology (LIT) at Carnegie Mellon University Libraries consists of two departments, Operations and Research & Development (R&D). There is a supervisor for each group and I am the division manager with overall responsibility for both.

The Operations Department, which has eight employees, provides support for the libraries' roughly 200 public and staff desktop PCs, 45 servers, printers, photocopiers, scanners, microform, and other miscellaneous equipment. The technicians and three system managers are also responsible for all of the software used by the libraries as well as maintaining a help desk to assist library employees and people using library hardware and software. Their work is largely routine in nature and it is possible to manage the implementation of projects by a simple spreadsheet that is updated monthly.

Our R&D Department is smaller. At the time the move to formal tactical planning was begun it consisted of three programmers, one of whom is also the supervisor. However, although they are fewer in number, their work is much more complex. While some time is spent on other work, they have been chiefly responsible for writing and maintaining the software which is used to create and display our digital collections.

Currently there are 16 databases hosted locally totaling approximately 3 TB of data. The collections have come from a variety of sources. Many are university related and include the papers of several respected former professors, costume books from the Fine Arts collection, a database of over 13000 slides from various sources to name only a few. The largest databases consist of more than a century of local Jewish newspapers totaling 1.5 TB and the digitized versions of almost 1000 books in our Fine and Rare Book Room donated by a local family. This latter collection accounts for nearly another terabyte. Smaller collections include the papers of a U.S. Senator from Pittsburgh, 50 years of a Pittsburgh architectural journal, and collaborative work with local museums. Funding for most of these projects, even those that have university connections, has come from individuals and foundations.

2 The need for tactical planning

Few of the projects were done in one phase. Not only has it taken years to digitize the larger collections but as our software became more robust and new functionality was developed, it has been incorporated into older databases. Keeping track of the status of each project and the addition of new features became complicated and time consuming.

At any given time, there are numerous project sponsors within and outside of Carnegie Mellon who must be satisfied. Each group brings their expectations as to how the work should be done and how quickly it should be completed. In addition to the donors and/or other people presenting proposals, there is a project manager assigned to each project. This person is a library employee who acts as liaison with LIT staff.

In 2004, I became the head of Library Information Technology for the second time after having served the libraries in a different capacity for several years. My background is managerial rather than technical but I have managed technical staff long enough to understand their language and concerns. As I settled into the job, it was quickly apparent that changes needed to be made.

Both the stakeholders for the various digital projects and the R&D staff were increasingly unhappy and the relationship between the two could be characterized as adversarial at times.

There were a number of reasons for the friction. There were more projects on the schedule than could be handled by the three R&D programmers and the Operations system managers. In addition, new work was added or the scope of projects was often changed without considering how this would affect the projected completion dates.

The R&D staff also had constantly changing priorities. It seemed that when one job was half finished, the programmers would be told that some new task had become their top priority. The projects' sponsors thought their work was being neglected and the programmers were frustrated. There was a multipage spreadsheet of work that needed to be done but few of the items ever seemed to be completed because resources were being diverted to other work.

Something had to be done before we lost good staff and/or donors decided to take their money and proposals elsewhere. I began to look for solutions to our informal management of the R&D work. The university's central Computing Services division had recently completed their move to a formal tactical planning process. I talked with their implementation manager but their unit has over 200 employees and their plan involved many meetings and reams of paperwork. I also looked at a variety of commercial products but the good ones were very expensive and difficult to implement while the cheaper ones didn't deal with the complex interpersonal problems we were facing.

In the end, I drastically streamlined the Computing Services model, removing layers of approvals and the formality of their levels of negotiations among their various groups.

Instead, we have created an agreement that binds both the people who bring proposals for digitization projects and the R&D staff. Initially I enlisted the libraries' senior management by spelling out the problems and the possible consequences of not changing our process. After talking to the project managers who are outside of LIT, the plans were taken to our Library Council which approves policy decisions. It was only by getting everyone to agree to the new system that we were able to create a process that works.

In essence, it is simple. The R&D department works on a six-month schedule. Our first goal was to eliminate scheduling more tasks than could be reasonably completed during the cycle. The programmers not only do new applications development but maintain existing code. The R&D supervisor and I did a study of their work for the previous two years and determined that roughly 30% of their time was spent fixing bugs and making other minor changes. That left 70% of the three programmers' time for new projects. Also, time had to be allotted for emergencies which would divert resources from new development. With these considerations in mind, I created the following planning process.

3 Tactical planning process

Each six months, we create a new schedule listing uncompleted tasks from the previous plan, new development work, and planned maintenance tasks.

1. Six-month plans run from January to June and July to December.

2. In addition to projects initiated by sources outside the library, any library employee can present a proposal for the following six-month plan. They are expected to state whether it is a new project or a continuation of an existing one and sufficient details to indicate the scope of the work. The division head or R&D supervisor may request additional information if necessary. There is a template used for formal proposals but some projects are based on email or text documents. Sometimes a potential project comes up in the course of a meeting or conversation prompting a written note.

3. Proposals are put into a pending folder as they are received.

4. Project review

(a) Six weeks prior to the start of a new cycle, the R&D supervisor and I discuss progress on the current plan and if there are any portions that couldn't be completed.

Possible reasons are:

(i) Project was discontinued by stakeholders—this could be for a number of reasons including funding or a change in scope or time frame.

(ii) Some portion of the work proved to be technically impossible.

(iii) Another project was given higher priority with the understanding this project might have to be postponed.

(iv) Work proved to be much more complicated than anticipated and the deliverables were rewritten.

(v) Stakeholders changed the requirements creating additional development work.

(vi) Staff problems prevented the completion (e.g., illness, resignations, etc.).

(b) If those projects can be scheduled for the next six-month plan, they are marked as 'carryover'. These projects will normally have the highest priority in the upcoming cycle.

(c) Sufficient time is allotted for troubleshooting and problem resolution on current services.

(d) At this point, new projects from the pending file are added to the schedule. Each project is divided into action steps with the name of the programmer who will do the work.

(e) If more projects are submitted than can be accommodated during the coming six-month cycle, they are prioritized.

Possible solutions are:

(i) In some cases, the work can be done in the Operations group.

(ii) The project can be delayed until the following six-month plan.

(iii) The scope can be divided into phases with only part being done during the next cycle.

(f) Projects which have not been solidified but which may require R&D time during the six months are also listed under a pending section.

5. A draft is prepared and shared with stakeholders. Expectations and schedules are negotiated. Details about the deliverables become steps for the work.

6. The final draft is presented to the Library Council for their ratification. After this meeting, no new projects can be added without the consent of the R&D supervisor and me. If a project manager comes forward with work which needs to be done but is not scheduled, the requester must agree to delay some part of one of their projects or get another stakeholder to agree to postpone work. The work to be delayed must be of the same magnitude of effort and be assigned to the person who would do the newly proposed assignment.

7. Occasionally during the course of the current six-month plan, the R&D supervisor will add new entries necessary to complete a step or to incorporate additional functionality that can be added without compromising the schedule.

8. During the six months, the R&D supervisor and I meet weekly to discuss steps completed, progress on other tasks and reprioritize and reassign tasks if necessary. Then I create an updated version with this information. A monthly update is completed which is shared with the Dean of Libraries.

Here is a sample page from an early six-month plan:

LIT Tactical Planning: R&D Project Priorities: Jan.-June, 2007
March 13, 2007

Development Projects — creation of infrastructure software
WolfPack [performs file conversion/OCR for various projects]
MARK
- Make available as shareware (Waiting on Office for Tech. Transfer)
- Optimization (speed up OCR & conversion throughput) — DONE
- Modifications as necessary for scanning projects

- Added: MS Word imaging module — DONE

HelioScan/DivaScan [complete scanning software migration from Helios to DIVA] BRIAN
- *Carryover* - Image scaling project – (Proving much harder than anticipated) Testing
- *Carryover* - Add standards-compliance / METS support

DIVA2 [used by Posner/Charette now, upgrade DIVA1 archival collections] CHRIS
- Add EAD/METS support
- Create JSP tag library to ease interface creation
- Administrator interface (make generic interface not tied to one project)
- NLP/relevance ranking — improve functionality and re-insert.
- Browsing

Charette *[finish & add to production]* CHRIS
- Scripts to fix renumbering of pages for those edited. DONE
- Incorporate rescanned pages — DONE
- Added: Merge in corrected OCR — DONE
- Release — DONE

Scanning Projects — provide setup & assistance
Jewish Serials
- User interface — CHRIS/BRIAN
- Traub database — MARK/CHRIS
- Setup Wolfpack — DONE
- Build DIVA database of 2000–4000 images (waiting for scanned images)

Pending — projects which may take shape during this time period
Eres — (E Linke, M Myers) LDAP authentication when/if needed. As a low priority, evaluate whether Reserve Direct can be changed to permit course level only access to students (Mark will investigate)

4 Lessons learned

The following are the most important guidelines for other groups considering this process.

For tactical planning to work, there must be buy-in by senior management who agrees to play by the rules and enforce them on others.

You must win the trust of both sides as quickly as possible especially if there have been problems between the technical staff and the project managers.

Do not commit to more than you can deliver. Especially in the beginning, build a reasonable pad into the cycle schedule.

It is essential that all parties be clear on the scope, milestones, and deliverables for each project. These should be included in the final plan. Naïve assumptions on either side can create serious ill will later.

Negotiation is very important when changes are desired by the project manager. If a stakeholder wants to add or revise a project after the cycle begins, something must be given up in return. That has to be from a project for that stakeholder that uses the same staff and is scheduled for an equal time commitment. The stakeholder cannot postpone someone else's project.

It is important to establish a fair system of priorities. Some will have deadlines imposed by the donor but these must be clearly communicated to the technical staff. Otherwise, we try to rotate through projects by the various stakeholders, so no one feels their work is being neglected.

Technical staff cannot circumvent the rules either. We cannot give priority to stakeholders who are our friends.

5 Results of our tactical planning process

Productivity has increased as measured by projects completed. The backlog spreadsheet has long since been completed.

Project managers and donors are happier because they see results, so they are more willing to wait their turn.

R&D morale has improved considerably. Programmers have begun suggesting new projects and functionality to add to the six-month plan.

Several other departments at the university have begun using the system for their groups.

The system is working so well that I am considering extending the process to our three system managers.