AN ACADEMIC MANAGING AN IT PROJECT USING CONSTRUCTION KNOWLEDGE

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INTRODUCTION

The author is a construction project manager with considerable experience who became an academic teaching in the area of construction management about nine years ago. Since then he has widened his academic interests to embrace project management as a generic process. In late 1999 the author, by now Dean and a member of the senior management team at UNITEC, was placed in charge of the installation of a new student management IT system in the institute. This paper summarizes the experience and considers the extent to which theoretical knowledge and previous experience in managing projects in the construction industry helped the author meet this challenge.

THE PROJECT

In 1997 UNITEC decided it needed to replace its existing management systems, after considering a number of options it decided to purchase a version of an American ERP system which had been customized to meet the needs of the Australian and New Zealand tertiary education market. In making this decision it was influenced by a number of issues including:

- it felt its risk was considerably reduced by purchasing an off the shelf product
- as eighteen other sites in Australia and New Zealand were purchasing the same product it felt the technical support from the vendor would be available.

Following the purchase decision and advice from the vendor a number of key decisions were made. These included decisions to modularize the roll out and go for a "close to vanilla" implementation (i.e. to avoid customization of the standard product). During 1999 the accounting and human resources modules were installed and commissioned without significant difficulties.

In late 1999 a review involving the senior management team was conducted of plans to implement the student administration module. This review identified that roll out of the student administration module involved considerably larger challenges for the institution; the functional requirements were complex and in some instances unique to UNITEC. Also use of the system was diffused throughout the institution with a large number of users, considerable change management processes would therefore be involved. As a result of that review it was decided that a separate project needed to be established with a clear management structure and that the roll out should be phased. At this point the author was given charge of the project with another member of staff from the academic development unit appointed as the day to day project manager.

Formation of the Team

During the establishment phase a team of staff seconded from various areas was formed. These included staff with functional knowledge from both the faculties and central administration and staff with IT knowledge from the Information Technology Support Centre. An implementation partner, the consulting arm of a major chartered accountancy firm was also appointed. A senior administration manager was seconded onto the project at a later stage to handle the change management aspects of the project. The team was located in a project office established for the purpose.

Whilst the team was being established a point of difficulty that became a recurring theme in the project emerged, that is the lack of available expertise with specific knowledge of the software. Whilst eighteen sites in Australia and New Zealand had all purchased the product no one had actually put the student administration module into operation. There was therefore a significant lack of available expertise in the market let alone within UNITEC or its implementation partner. This did for a short while delay start up of the project, however the implementation partner managed to recruit a very good person to lead their team which was supplemented at times by people seconded from the product vendor.

The resulting team had a good mix of knowledge and skills including:

- project management,
- UNITEC student administration systems,

- UNITEC IT systems,
- ERP installation (but not product specific knowledge)
- change management processes.

Initiation

Scoping and planning the project was initially problematic as UNITEC lacked expertise in this area. The implementation partner once fully on board was able to substantially overcome this problem for UNITEC however the project proceeded without clarity as to the breakdown of responsibility between the implementation partner and UNITEC (although there was a budget) and whether UNITEC had sufficient resources on the project. UNITEC's team was always less than that recommended by the implementation partner and appears to have been significantly less than that used on similar Australian projects.

The authors contribution to the initiation phase was:

- to establish a project control group with clear procedures
- insist on the establishment of clear milestones
- make clear the criticality of the roll out date
- implement formal risk management.

Project Procedures

The project team adopted procedures that would be familiar to people working in the project environment similar to those described in the literature (e.g. Turner 1993). These included:

- establishment of a project control group (PCG) with a clear mandate
- appointment of a member of the senior management team (the author) to act as a project champion.
- planning and control involving breaking of the project into segments with clear milestones
- tight scope management procedures
- risk management procedures

Decisions to adopt these procedures were influenced by advise from the vendor and implementation partner but made without reference to formal models.

The definition of the baseline scope of the project was developed through a workshop process facilitated by the implementation partner and then documented. However this scope was always loose and flaky in the area of responsibility for changes to business processes and the broader change management processes that are inherent in implementing a new system of this type with enhanced capabilities.

Risk Management

Risk management was conducted in a relatively simplistic manner based on Thompson and Perry's (1992) work. Risks were brainstormed and where considered significant listed and monitored. From time to time decisions where made to minimize risks or to put in place contingency plans to cope if necessary with the defined risk occurring.

The prime risks identified were:

- supply of New Zealand specific localization's (changes to the standard Australasian product to meet local need) by the vendor
- availability of sufficient staff
- change management
- lack of contingency in the budget and timeline.

Progress

The team quickly settled down and made good progress. The group blended as a team and worked very cooperatively. They managed to attract additional people to join them at key times and seemed able to bring people into the team in a way that the spirit of cooperation was maintained. The author's involvement was peripheral involving chairing the fortnightly PCGs and acting as project champion within the wider organization.

Key milestones were met and budget control maintained. A good deal of effort went into consulting and communicating with the wider organization. The team was highly motivated and worked hard and long hours. A significant problem was overcome when the UNITEC project leader was hospitalized and off work for about a month.

Phase one of the project was audited at about the one third point by Audit New Zealand. They were asked to look specifically at documentation of changes to the software and reasons for those changes. They approved the processes that were in place with one minor recommendation for improvement.

Phase one was also audited by a representative from the vendor at about the two third point. He was very complementary but did identify that the major outstanding risks were change management issues associated with the roll out and the supply of outstanding localization's by the vendor. Both of these risks were already known to and well understood by the project team.

Roll Out

The system went live on time and on budget in October 2000. Some significant issues around operator training and support were experienced nevertheless students were enrolled in time the start of 2001 in a manner that was a slight improvement on previous years.

However at this point a localization still had not been received from the vendor. This localization did not affect initial enrolment but it did affect the ability of students to get loans from the government for both UNITEC's fees and living allowances. The fees component of the loan is credited directly to UNITEC from the government department concerned. The localization was therefore "mission critical" to UNITEC as it affected both the students ability to study (the living allowance) and UNITEC's income (the fee loan). It had to be up and running by end of January.

The localization was originally due for delivery in early 2000 and had been promised for various dates from then on. It was eventually delivered in the first week of January 2001 but issued in such a manner that it was dependent on an upgrade to the HR module that was issued at the same time and itself involved a significant amount of work to test and operationalize.

Delivery after we had gone live and the dependency on also upgrading the HR module severely complicated installation of the localization and completion of phase one. UNITEC was unable to provide at short notice the resources both to implement the localization and implement the HR upgrade at the same time. With advice from the vendor a way of installing the localization without the HR upgrade was found and a number of work-arounds were put in place to enable parts of the localization to go live on an as needed basis whilst testing and debugging of other parts continued. Whilst most processes critical to UNITEC were got in place on an as needed basis, problems continued throughout the first half of 2001 with problems escalating rather than being resolved. This resulted not only in a blow out of the budget but also in:

- problems with providing user support
- loss of control on completion and hand over of phase one
- loss of control on phase two

arising from the project team being diverted to try and resolve this problem. In May a review was conducted and resources boosted including bringing in on site support from the vendor to overcome the problem. At the time of writing the problem is not resolved and continues to escalate. Kruzner (1995 p287) offers a number of proverbs, two of which seem particularly appropriate:

"Projects progress quickly until they are 90% complete then they remain at 90% complete forever."

"No major system is ever completely debugged; attempts to debug a system inevitably introduce new bugs that are even harder to find."

COMPARISON WITH CONSTRUCTION PROJECTS

From the authors perspective a construction project can be characterized by describing it as a project to design and build a one off prototype (a building of unique design) using well understood technologies and well understood processes. How construction projects are structured and managed is more or less standardized and all players are familiar with working on these types of projects and know the role they are required to play. In addition forms of contract, planning methodologies, documentation systems, lines of communication and processes for scope management are all more or less standardized and well understood. The project is also clearly defined, the end product is understood and the boundaries of the project are clear; things are either inside

the project or outside of it. Organizational change management issues are rarely if ever within a construction project.

In this environment when faced with a problem the project manager often is aided by strong tacit knowledge. They are able to sense a problem before it is a significant issue, react to it early and have the problem solved before it becomes major. They also often know all the players and know how to "rattle the cages" to obtain performance if it is not at first forthcoming. Further, additional resources are normally available if the project is slipping behind time schedule and people can join the project and become effective with only minor orientation. Corrective action to get back on schedule is therefore not particularly difficult.

By comparison this project entailed the installation of a standard product that was not well understood by the project team. The product was required to perform functions that were not clearly defined; some of these functions were processes already used by UNITEC but others were additions that only became available to UNITEC through the purchase of the product. The team generally had little experience of working in a project environment and were not familiar with project processes. In addition the boundaries of the project were unclear as implementation of the project involved the organization changing its procedures to gain benefit from the new system. The project team did not have management control over all the people or processes that needed to change.

Tacit knowledge was limited, the team did not have an instinctive feel for how well the project was going or the likely impact of potential problems. Neither did the team know the vendor or ever figure out how to "rattle the cages" with them. Additional resources were not readily available whether it be product knowledge or UNITEC system knowledge. The product knowledge issue was exacerbated by the number of organizations in Australasia installing the product at the same time. In addition the amount of time required to orientate new people onto a project of this type is significant, it therefore does not make sense to bring additional people on for short periods to catch up on time schedule. Flexibility of productive capacity and the ability to take corrective action to get back on schedule is therefore limited.

One pleasing aspect of this project was the culture of conflict so often found on construction projects was noticeably absent.

ANALYSIS

If it had not been for the late delivery of the localization the project would have been an outstanding success. The project would have been delivered on time and to budget by a surprisingly small team. It is worth therefore analyzing the positive achievements of the team as well as the reasons for the difficulties at the end.

Success Factors

THE TEAM – The ability of the project team to cooperate, share expertise and get on and get things done was in the author's opinion the major reason for the project's successes. The team as a whole had a lot of tacit understanding of people management and built a culture of cooperation. The team also had between them most of the required technical knowledge and skills. This knowledge was not neatly held by individuals having knowledge within one discrete category rather it was held in a more dispersed manner and shared.

Analysis of the "behavioral styles" of the team using Merrill and Reid's (1981) model confirms a reasonably well balanced team but with a weighting towards the "analytical" and "driver" styles. This suggests the team had a tendency to focus on progress and technical detail and less on how people were feeling.

THE PROJECT MANAGEMENT TOOL KIT – the use of project management processes described earlier facilitated the project being able to make progress and stay in control.

EARLY DECISIONS – Some of the early decisions made by senior management within the institution appear crucial in the success. These include:

- the decision to purchase a standard product and go for a "close to vanilla" implementation
- the decision to manage the implementation in a modularized manner using a series of projects
- the allocation of an almost adequate budget.

LUCK – the project had its share of luck particularly in being able to find good people at the required time.

Factors That Led To The End Problem

It is easy simply to blame the failure to have the troublesome localization operating when required on the failure of the vendor to meet their contractual obligations. However these situations are not uncommon on projects and do not always lead to project failure. Some project managers succeed in either avoiding these problems or in managing their way around the problem. With the benefit of hindsight a number of things seem significant in the inability to avoid the problems that arose from non delivery of the localization:

LACK OF TACIT KNOWLEDGE - regarding the impact non-delivery would have. Whilst the team recognized they were heading for a problem and did all the right things to chase the vendor through formal channels they did not, in the author's opinion have an instinctive understanding of the extent of the disaster they were heading for. They did not perceive the amount of additional work involved in commissioning the localization after the system was live. As a result they failed to press hard enough soon enough to get action out of the vendor and did not find out how to circumvent normal channels and get moved up the priority list. Secondly they failed to boost resources on the project quickly enough when the localization was finally received after the system had gone live.

STRUCTURE OF THE RELATIONSHIP BETWEEN UNITEC AND THE VENDOR - the harsh reality of this relationship is that UNITEC was and is a relatively small customer a long way away from the both the head and regional offices of the vendor. No personal relationships existed between UNITEC and the vendor. The localization that caused the problem was only required by UNITEC and one other customer who was not as far advanced with its implementation programme as UNITEC. The vendor had a finite development team, when pressure came on that development team from a number of customers with varying requirements it was perhaps inevitable that UNITEC would get a low priority. The lack of personal relationships meant that UNITEC had no means of reversing decisions made by the vendor regarding development priorities and get itself further up the priority list. If UNITEC had pushed its risk management thinking further it might have concluded it would be better to purchase the product without the localization and to develop this itself using local expertise.

LACK OF ADDITIONAL RESOURCES – Engwall and Svensson (2001) describe the use of "cheetah teams" to be used in circumstances such as that UNITEC found itself in once the localization was finally delivered. The idea being that a separate team is formed at short notice to take over the exceptional problem leaving the original project team to continue with the rest of the project. This suggests that the best course of action would have been to form a significant cheetah team to install both the localization and the HR upgrade in short time. The existing team (which by then had already been downsized) would then have been free to provide user support and continue development of phase two. In practice this would have been difficult as people with knowledge of either UNITEC's functional requirements or the software were in very short supply. To bring in people without this knowledge would have required significant orientation and training which did not at the time appear warranted. This issue of time to orientate people appears to be a fundamental problem with IT projects.

LACK OF CONTINGENCY BUDGET – In addition to the resource scarcity UNITEC did not have a contingency budget that was large enough to enable the project management team to feel they had the option of a cheetah team open to them. It therefore took the option of working through the problem with the existing team. At the time this decision was taken the expectation was that with three to four weeks of hard work the localization would be up and running. This would have met operational requirements. Hindsight suggests more decisive management action involving the formation of a cheetah team would have been a quicker and cheaper option. The option chosen resulted in a significant budget blow out which is the subject of a claim on the vendor.

Use of Theoretical Knowledge

It is not possible for the author to absolutely define which parcels of knowledge he brought to the project were obtained through experience and which were obtained through academic study. However given that this was his first IT project the following knowledge which was applied to the project can be identified as coming from theory:

RISK MANAGEMENT - The author and other members of the institute's management team were aware from publications such as Peat Marwick's 1997 report, that there were high failure rates with IT projects. This led to a number of decisions at the outset that provided much of the project successes. These included the decisions to:

- Buy a standard package and go a for a close to vanilla implementation

- Modularize the implementation into bite size chunks

It also led the author to decide to use formal risk management for the first time as described earlier. This generally worked well in that many problems were avoided. In addition a fair amount of contingency planning was done to limit the impact of defined risk events if they occurred, generally the contingency plans were not required.

The risk management process enabled the team to identify the risk of late delivery of the localization from the outset and constantly monitor the problem. It did not in the end enable it to avoid the problem

CHANGE MANAGEMENT - The author was aware of the importance of managing the organizational change aspects of project such as this from publications such as Pinto and Millet (1999). He was also substantially aware of the factors involved to achieve success. Processes used included extensive consultation on the set up of the system, user acceptance testing, user manuals, training and user support. The end result suggests this issue was a little underdone, primarily because it had not been well thought through at the outset of the project, as a result insufficient budget had been allocated and therefore insufficient resource was deployed. In addition the planned support for the roll out got diverted to dealing with the localization problem at the critical time.

Transfer of Construction Project Management Knowledge

Based on this experience the author has some sympathy with Stallworthy and Kharbanda's (1988) view that much project management knowledge is generic and transferable. Specifically the basic approach to framing projects and the procedures for running them are readily transferable. However he has reservations about concluding that PMs can operate in any industry. In this case the author had two sets of knowledge, project management knowledge and knowledge of the functional requirements of the project (from being a member of the client organization's senior management team). What he did not have was knowledge of the technology to be used. This understanding of the functional requirements cannot be dismissed lightly; it enabled the author to asked lots of questions regarding whether the system would perform and to guide the team as to priorities and timelines.

On the downside the author's tacit understanding of how projects work was framed within the construction paradigm. IT projects appear to be significantly less flexible than construction projects. They therefore need greater contingencies. This project proceeded without those contingencies and this exacerbated the end problem.

CONCLUSIONS

The experience has reinforced in the author's mind the importance of a number of issues.

EXPERIENCE AND TACIT KNOWLEDGE - The team throughout used good practice and had available to it good levels of explicit knowledge regarding how to run a project of this type which it made good use of. As a result the project was substantially delivered on time and to budget. The one significant exception to this, the localization problem was unlikely to have been avoided except by a more experienced team who had a deeper instinctive understanding of the problem they were running into. Tacit understanding developed through experience cannot be underestimated.

A GOOD TEAM – The author believes the ability of the team to work together was a significant factor in the success of this project. The author has not however worked out how one manages to achieve this level of teamwork. The people were in fact selected for their technical ability without any regard to their fit into a team building model such as Belbin (1993). The author is unconvinced that fit with the team in accordance with a model such as this should take precedence over technical ability when selecting personnel for a project such as this.

INITIAL PHASE SET UP AND BUDGETING - Most of the problems encountered, the unclear scope, the relationship with the supplier, the lack of training budget and the lack of contingency were built into the project at the outset. The literature acknowledges this as a problem area e.g. *"Although the majority of project expenditure occurs in excecution and control, the greatest influence over cost is during proposal and initiation" (Turner 1993 p281).* Kerzner (1995) amongst his variables for project success includes *"preconditioning such as:*

- *clearly established specification and designs*

- *realistic schedules*
- *realistic cost estimates*
- *avoidance of over-optimism" (p493)*

However little advice is provided in the literature on how to scope and budget an IT project such as this accurately at an early stage when the scope of the project is inherently unclear. A combination of approaches would appear to be necessary:

a) obtain good advice at the outset even if it involves significant expenditure before the project is committed to
b) adopt a rolling project approach whereby the scope and budget can be reviewed and redefined as the project proceeds and the cost-benefit of the project is clarified and refined.
c) incorporate sufficient cost and time contingency into the planning to allow for the unexpected.

CONTINGENCY PLANNING – Zampetakis (2001) has made comparisons with the construction industry and observed that construction is a maturer industry that has resolved many of its project management problems and is capable of delivering large projects on time, to budget and of the required standard. This is certainly the case in New Zealand. One of the components of the construction industry's improved performance has been careful use of cost and time contingencies. These have provided both the funds and time to take corrective action when necessary. It is the author's observation that IT projects are inherently both harder to scope and less flexible to manage than construction projects. It is more difficult to take corrective action on an IT project once it is out of control. If this is the case then the use of budget and time contingencies are more important than on construction projects and need to be of sufficient size to acknowledge the uncertainty in the scope and lack of flexibility.

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