

‘Best Practice at the IT-Enabled Factory: Tracking an Exemplar Project Student

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Abstract

This Paper tracks and illustrates a "Best Practice" industry project by a mature IT Bachelor of Computing Systems student who was involved in a physical control process at a Fellmongery and skin processing facility. The project was multi-dimensional with the student involved in purchasing and implementing equipment, modifying business processes, as well as designing and implementing a Tracking Database for the Operations Manager. This paper draws from features of this exemplar project and sets some success factors for quality industry-based student projects. Further discussion centers on how the student was also involved in onsite management and advice for the company. Academic staff from the IT teaching section were taken on a tour of the entire plant, and were given technical and managerial commentary by the student. The conclusion summarizes evidence that increasingly, degree students are operating at a significantly higher level in industry involvement. They provide a richness of previous experience, as well as a greater awareness of organizational realities. Indicative findings also show how the feedback loop from industry based students can benefit academic staff by visiting sites, meeting industry players and learning technologies used by current industries. Finally, this paper argues that an exemplar industry based project can provide incentive and modeling for other students involved with real-world projects.

Introduction

The single semester ITP7.290 project is the final piece of work that a Bachelor of Computing Systems student completes at the Eastern Institute of Technology. This final project of 45 credits (equivalent to 3 degree papers) has been designed to encourage students to draw knowledge and skills from a range of information technology papers and bring them together on an industry based project with a concrete measurable outcome. These IT projects differ from general workplace learning in that a specific output stemming from 5 months work is expected rather than a series of tasks performed over a time span in a work placement. In fact many of these projects are designed and built while the student is away from the company site. As Bridgeman (2003) outlines for the typical New Zealand Institute of Technology and Polytechnic IT degree project “the student needs to follow a process that requires them to demonstrate sufficient skills, competencies and process to complete their IT project; plus demonstrate an ability to manage the relationships between these technical and academic processes and outputs”.

The project showcased in this paper involved a mature EIT student, Kevin Wilkie, who created a database system for Tomoana Pelt Processors as well as providing onsite advice during the project life-cycle.

Background of the Company

Tomoana Pelt Processors Ltd is one of the largest fellmongery operations in New Zealand. They deal in the processing for export of Ovine (Sheep and Lamb) skins, Bovine (Bobby Calf) skins, Cervine (Deer) skins, Goat (Capri) Skins and wool to major world markets.

Tomoana Pelt Processors Ltd has many overseas clients; however 60% of their production is sold to China, the remaining 40% sold to such countries as Turkey, Italy, France, Belgium, Japan, and India. Tomoana Pelt Processors Ltd has an annual turnover of NZ\$40 million and at the peak of their season employs 140 staff. They process in excess of 3.5 million skins per year and have recently completed a major expansion to further increase processing capacity.

The Fellmongery Project

Tomoana Pelt Processors Ltd previously used Excel spreadsheets to record production information, such as supplier, species, grades, MAF certificates, orders and staff resources. This method did not enforce any business rules, or logic for the users and this spreadsheet based system was mainly a manual recording system. Tomoana Pelt Processors Ltd recognised the need to operate smarter and more efficiently, hence the desire to establish a bridgehead where their business starts. The database allowed the input of accurate information about the raw materials going into the system as skins from the suppliers arrived.

System Solution

The product to be developed by the student was called the Bin Tracking System. It consolidated the requirements of Tomoana Pelt Processors Ltd by combining the new management system with a database application specifically designed for the task required. The Bin Tracking System comprised of a database, an application program and associated interfaces to label printers and barcode scanners. These components were demonstrated to Tomoana Pelt Processors Ltd as the project progressed. Users were trained and operating manuals supplied by the student. The new Bin Tracking System needed to have the data resident in the existing system input into the database ready for operation.

The Student's Role

The student's role, Kevin Wilkie, was multidimensional for several reasons. Firstly, he was closely involved in the physical process of the Fellmongery. He had been involved in providing electrical services to the plant previous to the project. Secondly, he was in close liaison with several plant managers, the operations manager as well as the general manager, so he had a managerial awareness of wider issues. Thirdly, he was close to the data and existing IT systems at Tomoana Pelt Processors, which gave him an insight into the deficiencies of the existing system as well as a good "feel" for the data and information involved.

Throughout the project Kevin was onsite, watching real world activity, evaluating existing spreadsheets and reports and talking to personnel throughout the business. These features, we believe, are key characteristics of a high quality industry project. Although many times being onsite is not compulsory for an industry project, it does lead to better results.

Insights for Quality Industry Projects

What Sets This IT Project Apart from the Average Capstone Project?

Firstly, the student spent considerable time at the site, although this was not a compulsory requirement. Rather than focusing on a narrow collection of data and artefacts used for building a database, the student immersed themselves in the context in an ethnographic approach which helped him consider wider issues at the plant than simply how to build a database. Discussion with several layers of management and staff helped as well as hands on experience with the physical factory process. This type of ethnographical research can be useful as a specific approach to the interpretation of a culture, helping with data collection and analysis of the culture under study. Information systems researchers are becoming more accepting of the need to adopt techniques which consider the historical and contextual aspects of information systems (Sayer & Harvey, 1997).

Another success factor was the autonomy given to the student so that he could order equipment (e.g. a thermal printer and plastic labels) and set this up in conjunction with the database system. Allowing the project or workplace student some freedom to use resources for their project can free the student from the restraints of the workplace environment. The increased responsibilities undertaken by the student may have been due to his maturity. Given that over 65% of EIT's degree

students are over the age of 25 (this is probably similar across NZ ITP's) we need to take this into account when defining workplace assignments.

Finally, another success factor was the willingness and ability of the student to experiment with live data and test the database system prior to use and generally 'get a feel' for the use of real data. This meant the cutover to the new system was smooth and successful. Basically, the student took responsibility for all aspects of the projects success from beginning to end.

Mann and Smith (2004) acknowledge the challenge in capstone projects is the relationship between process and product. They also cite a number of exemplar projects where good process has been used to produce a product of excellence, and in this example of the Tomoana Database we can see evidence of both. Some students produce an excellent IT "product" e.g. website, database but their documentation of process does not achieve the same level. Other students produce an acceptable product but produce a well documented process. Only a minority of students achieve both an excellent "product" and high quality documentation.

The Supervising Institution Benefits

There are appreciable benefits to supervising staff and the teaching institution involved in student projects when a good professional relationship has been built up by the student. In this case, liaison with supervising staff and a willingness to show EIT staff around the plant, meet key personnel and showcase the IT solution within the context of an operational plant provided some real benefits to the supervising institute. The student was able to provide a wide range of evidence of work completed including understanding of factory processes, managerial oversight and software running on company computers. Where this occurs, supervising lecturers get to meet some key industry personnel and industry players appreciate interest displayed from teaching organizations. This illustrates a valuable feature of projects where staff are able to meet industry people, walk through their premises and show an interest in their operation. Benefits from these meetings include; opportunities for guest speakers to be invited to classes, another project to be offered by the sponsor site again, and general goodwill built up between a particular industry site and the tertiary institute.

There is already a generally good satisfaction rate amongst industry hosts of IT projects across most ITP's as Sutcliffe and Kuypers (2000) indicate in their own survey. However, tertiary organisations utilising industry projects for liaison should increase this satisfaction rate with higher quality projects.

Conclusions

As a result of examining this exemplar student project, there are some key questions project supervisors and potential students could ask to help predict success where specific outputs are sought from students involved in industry-based projects:

Firstly, does the potential industry project allow the student to spend some time on-site, perhaps even working for some time within the company? It would appear that the more open the access is then the more likely it is that the student will achieve a holistic view of their project within the context of the wider organization. Conversely, if the student can only gain limited access to a contact within an organization and has a more theoretical idea of the company's processes then success will be more limited. This may be difficult to achieve in businesses with a more virtual product/service.

Secondly, what work experience or life experience does a student have before undertaking an industry project? One of the success measures from the showcased project appears to be the maturity factor, and in this case the previous experience as an electrical contractor at the site helped with an appreciation of physical processes and managerial overview. How can this success factor be fulfilled for a younger student who has entered a degree program direct from school? This previous experience may also be a critical factor as the student needs to balance academic and industry requirements (Albertyn, 2002). Are there ways that we can provide some workplace experience, either at the site or elsewhere, for younger students before they encounter the full industry based project?

Thirdly, will the student take full responsibility for the industry based project from start to finish? This may not always be in the student's control, but may be a key indicator of commitment for successful completion. Supervising organizations may be able to check the conditions of engagement at the industry sponsors workplace before the student starts a project to ensure that reasonable autonomy is given to the student.

In conclusion, I believe this exemplar student project at 3rd year level on an IT degree program highlighted some success factors that may be useful for consideration by tertiary organizations who are supervising project based workplace learning.

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