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AN EXPERIENTIAL APPROACH TO TEACHING SOFTWARE PROJECT MANAGEMENT USING PRINCE2

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Abstract:

Many of the problems related to the effective implementation of ICT projects are due to ineffective project management inadequate management skills and poor business focus of the project manager. The academic community have generally done a competent job in terms of providing technical skills – but there is little emphasis on equipping & preparing students with the requisite skills sets for managing and participating in software development projects. This paper presents one approach to addressing this problem by actively requiring students to manage a small group project as part of a marked assignment. The emphasis is predominantly on the management aspects using the PRINCE2 project management method and the technical ICT elements are left to the group's discretion. Students are directed towards specific elements such as business case, management control and the need for on time delivery. Results have to yet to be fully quantified but students have expressed positive comments and indicate appreciation of "real world project experiences" in a controlled academic environment

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1. Introduction

Many ICT failures are due to a lack of effective project management. These issues are well known and documented elsewhere (Brooks, 1995: Yourdon, 2003). However the facility for effective project management education and training in the ICT domain is very much under provided. Although there are many generic professional project management training courses they have their own problems and issues (Winter, 2006). Similarly project management education at university level is mostly provided by Business Schools or Engineering Departments and few offerings directly focus on the software development environment. This paper outlines the experiential approach to teaching software project management adopted by the School of Computing at

Edinburgh Napier University. Agile development methods such as DSDM/Atern are discussed and presented as part of the taught components but the PRINCE2 project management methodology is used to provide a framework for a software development project. PRINCE2 and DSDM/Atern share many common elements and intentions (DSDM Consortium) but PRINCE2 is preferred due to its emphasis on governance and the provision of detailed control management documents that can be tailored to suit different circumstances.

2. Developing Project Management Skills within the Academic Community

Recent literature has challenged the way project management is taught at university level with the lack of emphasis on human or "soft" skills (Pant & Baroudi, 2008). There is increasing emphasis on balancing the hard technical approaches such as PMBOK (Project Management Institute, 2004) with the softer human skills approach (Winter, 2006). There are still fewer approaches that attempt to provide students with this balance through experiential learning within a technical project management framework methodology such as PRINCE2. Experiential and action learning have long been held to be effective means of providing education and training in such professional environments as project management (Hicks, 1996).

Approved commercial training organisations teach PRINCE2 in the traditional manner of transmission and assimilation and the emphasis is very much on passing professional examinations at the end of a five day training course. University education has the opportunity to develop more experiential and student centred learning approaches and many have created Group Project modules where students deliver a software project. However these modules frequently lack a coherent project management control structure and the emphasis quickly moves to software & development issues whilst the management elements are marginalised and receive only a small proportion of the allocated marks. Whilst students understand and appreciate the issues that occur within project groups these module provide no formal project

management context and robust framework context within which to understand, analysis issues and learn from experiences. This area is not at all well developed within academia which is not surprising given the relative recent nature of the project management domain.

The exercise under discussion aims to provide students with practical "real-life" software project management experience. There are many difficulties usually encountered in such academic exercises. Mostly they relate to the following – an over emphasis on the technical elements, a lack of awareness of the overall business & organisational objectives of the project, an inability to plan properly, an over emphasis on resource scheduling (MS Project) without focussing on actual deliverables, plans are rarely consulted once produced and are usually never revised, additional objectives and deliverables are added in an uncontrolled manner and changes accepted without proper analysis of the overall business case or the project plan. In many instances scope creep originates from the technically ambitious development team rather than the client. The Managing Software Projects module is delivered at senior honours and masters level in the School of Computing. Students are drawn from a variety of academic programmes and many of the undergraduates have a year's work placement experience. Students are organised into groups of 4/5 ensuring a mix of programmes and previous experiences and skills. Through two two-hour lecture and tutorial sessions an overview of PRINCE2 is provided at the beginning of the module

3. Assignment Scenario

The scenario involves a small company whose aim is to increase its turnover by 20%. Students are directed to a number of potential solutions including the building of an operational web-site. The assignment objective is to deliver a presentation in week 8 of the semester where a number of acceptable deliverables may be presented. These range from a fully functioning prototype to a simple series of hyper-linked html pages. Emphasis is placed on the final technical deliverable as a "proof-of-concept" only. This requires students to appraise their own skill sets and think carefully about the

scope of the project and what may be delivered in the allotted time. Furthermore the final software deliverable accounts for only 25% of the assignment mark with the majority allocated to effective management of the project.

4. Managing the Assignment

Each student is expected to spend 6 hours per week on the assignment. By allocating a notional £50 per student hour a total budget for the project can be derived and a 10% time and cost tolerance for the project is provided allowing a group to submit in week 9 but at a penalty. A list of deliverables detailing the proposed web-site functionality is provided alongside non-technical requirements such as reports recommending hosting solutions, security considerations and compliance with usability criteria etc. This enables the group to allocate discrete tasks to individuals as well as allowing the less technically inclined students to contribute. Using the deliverables list, the group negotiate the required functionality with the "client" (as represented by the module leader) using the DSDM/Atern inspired MoSCow technique (DSDM Consortium, 2008). Emphasis is on timely delivery. Modified and tailored PRINCE2 documentation is provided on the module intranet along with a delivery schedule throughout the assignment. It is important that these management documents, which are key to the control element of PRINCE2, are tailored for the needs of the assignment. Not only is tailoring the PRINCE2 project management process important in providing an appropriate level of control for the group to manage their project effectively it also demonstrates and adheres to the major emphasis on tailoring prominent in the 2009 version of PRINCE2 (Office of Government Commerce, 2009).

4.1 Assignment/Project Start-Up

From the start, focus is on the business justification of the project through the requirement to produce the PRINCE2 management products Business Case and Project Brief. Business alternatives are considered as are different approaches to the delivery of the proof of concept. The company's objective of increasing turnover by 20% is reinforced and the group undertakes an assessment of the business case given the

projected benefits and the costs of delivery of the project. The PRINCE2 Product Based Planning technique is relied on for planning the deliverables, producing Product Flow Diagrams and Product Descriptions and the groups are required to deliver plans using this technique before proceeding to development. In the first two weeks of the assignment, only these PRINCE2 management products are to be delivered and the potential for changes in direction and deliverables to be produced are assessed.

4.2 Assignment/Project Delivery

Weekly two hour tutorial sessions with the module leader provide the opportunity for each group to query the "client" and provide a Highlight report to the "Project Board". In addition as well as a time sheet for all members of the group, they are required to submit an Issue Register and Risk Register where all project problems and concerns are logged.

Timesheets are important as they provide the only real measure for tracking costs. In conjunction with the Issue & Risk Registers they also provide evidence and an audit trail. This may be used to allocate different marks within the group according to contribution. Highlighting this facility is usually sufficient to encourage students to participate and contribute equally. Students choose their own roles within the group and as expected - personalities and levels of experience influence work allocation. During the tutorials many of the softer human aspects emerge and are discussed in terms of how they influence the delivery of the project and the ways in which they can be addressed

All project elements are dealt with through the mechanism of the PRINCE2 management documents which are required to be kept up to date and delivered at each tutorial. Experience indicates that the majority of queries from the groups are usually resolved by referring them back to the initial scenario documents or their own management documentation where many of the issues and points have already been

logged. Group/student issues & absences are logged in the Timesheets and Issue & Risk Registers accordingly.

Throughout delivery there are a number of actions that the module leader, through the "Project Board" & "client" roles, may choose to implement to highlight important PRINCE2/project management concepts.

- Undermine the Business Case – by altering the required turnover percentage increase. This requires a re-appraisal of the deliverable and consideration of scope. An "Exception Report" management document is provided so that the group may escalate situations which they assess as exceeding the allocated tolerances. Credit is given for the use of appropriate procedures and processes in these situations
- Introduce additional scope elements – or change the priority of required deliverables. This requires students to engage with the "client" and use the MoSCow technique to consider and even reject client requests. Saying "No" to a client and managing client's expectations offers considerable challenges to some ICT students.

- Change group members - if the groups have advance notification of this possibility – they start to pay particular attention to plans and documentation and often start to allocate work in pairs.

The use and selection of these options is usually driven by how well the groups are performing. These actions require the group to re-consider their approach and during tutorial discussions the group really start to appreciate the value of the management documentation and a well structured project management process.

4.3 Project Close

To date only one group has chosen to deliver the most basic web site consisting of linked html pages. However the pages were extremely well designed and careful attention had been paid to usability criteria Group presentations in weeks 8 /9 in front of the whole class represent the final deliverable of the assignment. Students are also required to submit an End Project Report on the day that requires them to openly and honestly discuss how well the project was managed and what elements they might have done differently. This is perhaps one of the most useful sessions of the assignment and students wholly engage with this process.

5. Conclusion

Through the experience of delivering the assignment, students understand and employ the PRINCE2 principles of Continued Business Justification, Learning from Experience, Defined Roles & Responsibilities, Manage by Stages, Manage by Exception, Focus on Products and Tailor to suit Project Environments throughout the 8/9 weeks duration of the assignment. One point that clearly comes through is the student's appreciation on the realisation that, in a PRINCE2 project, ultimate responsibility lies with the Project Board. Whilst current views on the assignment are still anecdotal, it appears that students enjoy and greatly benefit from the whole exercise. Comments have ranged from "a bit too much like real life" to "I'll know how to manage my next project"

Students appreciate using a widely used, publicly available project management method that provides an effective controlled environment within which their software development work is managed. They appreciate the management by exception or "hands-off" approach as well as having the freedom to choose the technical solution to deliver. The tutorial interactions where they interface with the "client" and receive direction from the Project Board are well attended. After initial scepticism with the timesheets and Issue & Risk Registers, students value their role in helping to identify, isolate and track problems. Overall students have a very good awareness and understanding of project management processes and how they influence successful project outcomes.

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