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Early Warning Signs Of Communication Failure In Is Projects: A Case Study

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Abstract

This paper seeks to apply a previously published framework of commonly identified Early Warning Signs (EWS) of project failure through an empirical study of an active IS project. The case study is observed from the stakeholders' perspective; focussing on their interaction with the project and the development team. The occurrence of any EWS is catalogued with an explanation of the causes, effects and a description of any action taken. The observations are also taken pre-procurement to identify any EWS which occur before the development team commence work.

The EWS, derived from a survey of the literature, are evaluated in a real-world setting leading to an extension of the EWS framework. This paper focuses on those EWS which have been categorised as Communication EWS. Through the analysis and extension of the framework we provide a greater understanding of the "communication" concept in IS projects.

Keywords: Early Warning Signs, Failure, Communication, IS Projects

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1.0 Introduction

A project is defined as a sequence of unique, complex and connected activities that have one goal. (Wysocki 2006)

The uniqueness of any project can be interpreted as such that either one or more elements of the project or the combinations and permutations of connected activities are unprecedented. This unpredictability, the high degrees of change and uncertainty and a series of complex interconnected tasks that need to be completed within a time constraint (Olson 2003) introduces a considerable risk of failure.

Project success is defined classically as occurring when the project must be completed by a specific time, within budget and according to specification. A project failure is therefore logically defined as occurring when one or more of these three success criteria are not met (Fortune and Peters 2005). It is widely accepted that the project can also be counted as a failure if it is not used after implementation even if it meets all three success criteria 'on paper'. We therefore propose that the third criterion

"according to specification" should be defined as "according to the client requirements" which, unless the specification has been thoroughly determined, is not always the same thing.

The I.S. industry has invested effort and financial support into improving I.S. Project Management with a view to reducing project failure rates for decades, yet the failure rates still make depressing reading (Schmidt, Lyytinen et al. 2001). The Standish Group's 2006 Chaos Report states that only 35 percent of all projects started in 2006 are considered a success (Rubinstein 2007). Although this is considered a welcome improvement on the original 1994 findings a 35 percent success rate is still uncomfortably low.

The causes of project failure are often described in broad terms following investigation into historical case studies based on failed projects; providing answers to the question, "What went wrong?" The following list of causes, taken from a survey of the literature, appears in no particular order (May 1998; Sumner 2000; Schmidt, Lyytinen et al. 2001; Olson 2003).

- Stakeholder conflicts
- Poorly defined requirements
- Poor cost & schedule estimation
- Poor skill matching or skills levels
- Failure to plan effectively
- Communication breakdowns
- Poor Architecture
- Lack of top management support
- Lack of user involvement
- Lack of project scope definition
- Failure to follow an appropriate methodology
- Technological failures

More recent work focuses on identifying potential project failures within a live project with a view to forecasting failure rather than performing autopsies on past projects. Terms such as risk factors, critical indicators and early warning signs are appearing in literature which focus on diagnosing potential problems before the problem escalates and failure occurs (Pacelli 2004; Kappelman, McKeeman et al. 2006).

The literature suggests ways in which the project manager and the development team can avoid project failure, by improving their processes and practices. Within these texts the stakeholder is portrayed as a customer, a data repository or an obstacle with sections devoted to building good relationships, gathering requirements, conflict resolution, cultural differences and organisational instability (Burke 2003; Meredith and Mantel 2003). Their behaviour within the project is normally observed from the development team's side of the fence.

This paper is part of a wider research project investigating the development of an Early Warning System; a visualisation of the occurrence of early warning signs to accelerate the project manager's decision making process. This should enable him/her to react quickly and prevent the EWS from turning into project failure (Noble, Oates et al. 2007).

In this paper we seek to evaluate some of the project failure early warning signs that have been identified from a survey of the literature through the use of a descriptive, longitudinal case study. The case study is an active Web Development project observed specifically through the stakeholders and their interaction with the project development team.

This case study offers a different perspective of an I.S. project and starts recording early warning signs from the time that the project is initiated by the stakeholders, i.e. pre-procurement and not from the time that the project development team commence work.

2.0 Early Warning Signs of Project Failure

The EWS have been developed prior to the case study as a result of a survey of the literature. Output from a study involving 19 area experts and 55 IT Project Managers (Kappelman, McKeeman et al. 2006), was used as a starting point for the list; this included 53 EWS which had been identified and ranked by importance. The study identified three general areas of risks; People, Process and Product into which the EWS can be grouped. It did not however associate each of the EWS with the categories defined. The list has been revised and extended and now includes 68 EWS.

Each EWS has been categorised and sub-categorised using an extended list of categories shown in Table 1.

People	Process	Product	External
Support/Commitment	Methodology	Technological	External
Communication	Communication	Communication	-
Team Structure	Schedule	-	-
Ability/Experience	-	-	-
Conflict/Instability	-	-	-

Table 1 Extended list of EWS categories and sub-categories

As the original EWS list was created by 74 I.S. practitioners, it is introspective and centres on the process and product and the project teams abilities. The stakeholder does appear in the list but unflatteringly as an accelerant of scope shift and creep. The EWS list required evaluation with regard to its completeness and balance. This paper describes a case study which is being undertaken with a view to observing a web development project from the stakeholders' vantage point; to determine the behaviours and causes behind the EWS that begin to emerge.

3.0 The Case Study

3.1 Research Objectives

The case study will be a longitudinal, descriptive study. The completed analysis of the project will tell a story, including discussion of what occurred and how different people perceive it (Oates 2006). The case study has been selected because it is a reasonably typical instance representative of the whole class and therefore generalisations may be applied to this interpretive piece of research.

We will observe instances of the EWS already identified and the occurrence of new EWS. We will try to identify or explain them through understanding the context within which they occur and how the project team and stakeholders perceive them. By using the categories applied to the EWS we can make a generalisation about the dominant areas in which these occur.

We began our observations as soon as the budget was approved by the stakeholders' top level management and the Project Board was formed. It is at this point that the stakeholders consider the project to have commenced and not at the point that the developer begins work.

3.2 Limitations

At the time of writing, the project is in its final stages of completion and is still under-going User Acceptance Testing, therefore the full impact of the EWS cannot be rigorously examined and no comment regarding the success of failure of the project can be made at this stage.

We have attempted to remain as impartial observers throughout the case study so that we have no impact of influence on the decisions made or the outcome of the project. However, the organisation had kindly permitted full unlimited access to all aspects of this project and company data in return for some consultancy. This consultancy was limited and did not compromise the integrity of the case study. For example clarification could be sought on a technical term. The answer could be provided if it was believed that the project board could easily seek the answer elsewhere.

The web developers procured to supply the web solution also granted access to their side of the project. It was felt that in answer to any questions regarding the progress of the project that all responses were extremely positive. This was either because they did not see us as impartial observers, that they were acutely aware that no contracts had been awarded yet for Phase2 of the client's project, or that these were genuine positive responses.

The final constraint was that we were only present at the Monthly Project Boards and during the procurement process. All other contact was made by telephone and e-mail.

3.2 Organisational Background

For this case study, pseudonyms will be assumed to protect the identity of the parties involved. A large national public sector group, named here as PSG, is supported by 5 service bodies; Payments, Security, Pricing, Supply Control, and Consultancy.

Figure1: Organisational structure for new PSG Services body

Each body had their own governance, executive board and their own website. Under the new structure, they will become a division within one unifying organisation; PSG Services. PSG Services will have administrative rights and governance over all 5 divisions.

The unification of the five organisations will be symbolised by the replacement of five websites with one website. The launch of this new site will be a platform from which to launch PSG Services.

"Pivotal as to whether we succeed or otherwise" – Pricing

3.3 The Websites

There are few similarities between divisional websites with regard to layout, hosting and content management. Currently PSG Services hosts and content manages the Pricing site, Security performs their own content management and the other three bodies use external companies. There is no single business process for authorising or authoring content and it would appear from comments from the stakeholders and from the state of the current sites that there is an unclearly defined process for removing or cleaning up content. This has resulted in very weighty websites. Prior to the start of the project Consultancy had begun the lengthy process of streamlining its content. Pensions and Pricing have the largest sites. Security may have a lot of content but due to the sensitive nature of their information it was not all made available. There is a lot

of either security or secrecy surrounding their site and their content management methods.

There is no consistency of branding or navigation across the websites and the content models behind each one are not logically defined. With every website there is a confusing mix of public and 'corporate' information. All sites are hard to locate via a search engine. PSG Services believe that a unified Content Management System (CMS) website will lead to a unified organisation and will lead to other benefits:

- Single governance
- One-stop website
- Ease of use for site users
- Uniformity of branding

There are certain risks involved in uniting the five bodies which will be monitored as part of the wider case study.

- Resistance to change
- Merging practices
- Five different cultures
- New website may be just a portal to five separate sites rather than a hub.

3.4 The Story – An Outline

Table 2 is an extremely simplified description of the project's plan; described using the Monthly Project Board's meeting agenda. It is included here to provide a framework through which to describe the timings of the EWS.

Stakeholder Event	**Date**
Stakeholder Website Workshop – Assembling the key stakeholders and developing the scope	Nov 2007
Recruitment of a consultant Project Manager	Jan 2008
Project Board Meetings	
M1 – Establish Project Board (Figure 2)/ Define Scope	Feb 2008
M2 - Evaluation Criteria/Produce Invitation to Tender	Apr 2008
M3 - Tender Presentations and Supplier Selection	May 2008
M4 – Requirements start/ User Groups described/ Content Migration outlined	June 2008
M5 – Review of Requirements/Card sorting/User groups found	July 2008
M6 – Information Architecture distributed for review/Content audit-	Aug 2008

migration/Branding	
M7 – Design/ CMS training plans/ Content review	Sept 2008
M8 – Content Style/ CMS	Oct 2008
M9 – Bug Fixes/Images/UAT discussed	Nov 2008
M10 – Review	Jan 2009

Table 2. Stakeholder Key Events and Monthly Project Board Meetings

Figure 2 illustrates the structure of the Project Board and the Project Team formed by PSG Services at the first monthly board meeting.

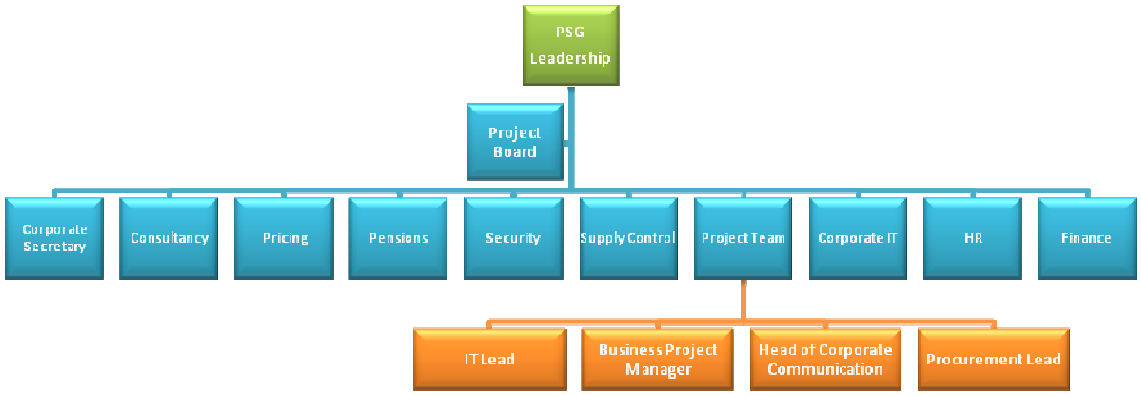

Figure 2. Project Board and Project Team personnel

4.0 Identified Early Warning Signs

The project was measured against the extended list of 68 EWS. Of these EWS, 20 occurred within this project. Each was recorded with regard to where in the Project Lifecycle they occurred, why they occurred, what action if any was taken to deal with them and how they could have been prevented. Additional EWS have also been identified which were not on the original list. Upon completion of the case study the EWS will be revised and extended further to include them all.

The majority of the 20 EWS that have been identified were in the sub-category Communication. Figure 3 describes the categories where EWS were observed.

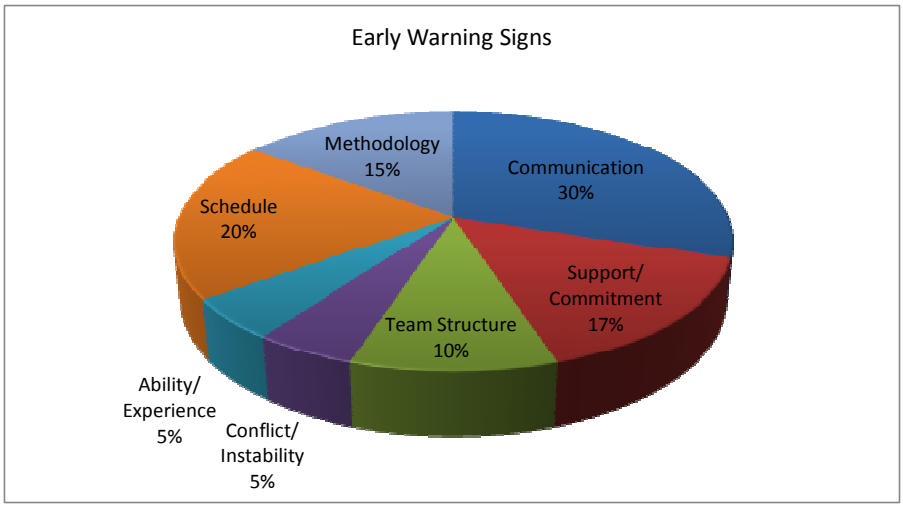

Figure 3. Chart display distribution of EWS across categories

4.1 Communication

Due to the size of this case study and as the project is still in its final stages of User Acceptance Testing this paper focuses only on the most densely populated of these categories; Communication. The original list of EWS within this sub-category is displayed in Table 4.

In this section of the paper we list each EWS identified and describe the observation(s) in context, suggesting a cause and describing the responses and reactions to the occurrence. Of the original 15 communication EWS we observed six and some of these EWS occurred more than once.

Aliases have been used for individuals, in order to protect their identity and to avoid using acronyms for lengthy job titles. These are defined in Table 3.

Alias	**Job Title/ Role**
Paul	Business Project Manager (externally contracted to act on behalf of the stakeholder)
Robert	Developer's Project Manager
Matthew	PSG Services' Corporate Secretary and Project Champion
Louise	Head of Corporate Communications
Andrea	Content Editor
Chris	Usability Designer

Table 3. List of aliases used throughout the description of the study

Description	Category
Difficulties in contacting or receiving a response from project stakeholders.	People
The project has not been made visible to the project stakeholders.	People
Communication breakdown among project stakeholders.	People
Project stakeholder delays decisions causing deadlines to be missed.	People
Project manager(s) cannot effectively lead the team and communicate with clients.	People
Poor project status reporting to project team.	Process
Poor project status reporting to project stakeholders.	Process
Project stakeholders have not been interviewed for project requirements.	Process
No project status progress process.	Process
Failure to gather requirements via joint application and design.	Process
No written commitment for the project outside of the project team.	Process
There are no project communications plans or resources devoted to managing and communicating project expectations.	Process
Key stakeholders have not signed the project charter.	Process
Functional, performance and reliability requirements, and scope are not well defined.	Process
Problems interpreting design	Product

Table 4. List of Communication Early Warning Signs before the evaluation by case study

4.2 Observations

"Project manager cannot effectively lead the team and communicate with the clients"

Although not explicitly defined, the EWS has been interpreted as referring to the Project Manager of the development team. This EWS identifies two mutually exclusive problems; lack of team leadership and poor communication with the clients. This EWS appeared several times throughout the project and each time it was the communication with the clients which was an issue. An "inability to effectively lead the team" was not apparent. In the revised list, this EWS will become two separate risks.

Observation 1:

The lack of effective communication first became apparent in the second Project Board Meeting (M2). The Project Board (Figure 2) had had difficulties in assembling

user groups for the card sorting exercise. PSG's current website users from across the organisation and across the country were being recruited to take place in the card sorting workshops. Some of the divisions were unable to achieve the targets that they had been set by the development team, for example three consultants, six branch managers, six pensioners etc. The delay seemed to be caused by two factors; the project board stated that the right users were difficult to recruit and there seemed to be some confusion about whose responsibility it was to recruit them. Both factors could be attributed to an inadequate explanation of why the stakeholders were required and who was going to collate them.

In the previous meeting a brief explanation of the card sorting exercise mechanism was given with regard to how the data will be collated and how it would be used in the generation of the information architecture. The distinction between an Information Architecture and a Site Architecture had not been made. The project board then felt unnecessary anxiety about the level of website experience the user groups should have if they were to have such an enormous impact on how the website was structured. This problem would keep reappearing throughout the project. The card sorting exercise and Information Architecture was described not by Robert, the project manager but by the Usability Designer, Chris. Chris would run the card sorting workshops and develop an Information Architecture based upon the findings. Therefore the responsibility of this EWS should not be attributed solely to the project manager.

The task of selecting the user groups came as something of a surprise to many of the project board. In the previous meeting Robert informed the Project Board that recruitment companies would help find members of the public that use the website, but that other users may be harder for the suppliers to find so they would need assistance. A discussion took place on which bodies should be represented but specific recruitment tasks were not clearly assigned to individuals on the Project Board. The members of the Project Board were in the best position to select participants for the user groups, but some members did not feel the task should fall to them or that the project should be causing them so much additional work. One

member commented “what are we paying them for if we have to do all the work?” and another commented that the “card sorting seems to be a waste of time”.

If the importance of the card sorting exercise had been made clear and the task of producing appropriate user groups had been clearly delegated then perhaps the Project Board would have been more focussed and motivated to complete the tasks with due diligence and urgency. It was also the first time that any disappointment felt about the developers was expressed. This too could have been avoided with improved communication.

Observation 2:

At the third monthly project board meeting the Information Architecture (IA) was presented not by Chris, its author, but by Robert.

The IA was distributed to the Project Board before the meeting with no accompanying explanation. As described above, the card sorting objectives had not been described adequately so many board members believed they had been presented with the Site Architecture. They then had time before the meeting to grow increasingly anxious and frustrated with the architecture presented. It was not what they had expected and bore little resemblance to their current sites. There was a general consensus that the area of the site which represented each division would not be easy to navigate around and that specific content was “in the wrong place” and “users will never find it there”. One member was heard to say prior to the meeting, “It’s a load of rubbish. Scrap it. They [the developers] don’t understand our organisation”.

These comments were very revealing. The Project Board believed a) the IA was the site map and represented a layout, b) the suppliers designed the IA with little or no input from user groups i.e. a connection between the card sorting activity and the resulting architecture had not been made and finally given their apparent shock at how it differed from the current site they believed c) that there was little wrong with the existing architecture and perhaps expected the new architecture to reinforce the current design.

During the meeting their opinions were voiced to Robert. Pricing was particularly unhappy with the users influencing the structure of site that they know little about and that the Pricing Communications Lead would be the best person to design the structure as they have a detailed working knowledge of the current site. Pensions were in agreement and both requested that a meeting was set up with Chris so that they could redesign the IA. At this stage there was a very real danger that it would be re-engineered back into its original form.

Robert made little comment other than to reassure the project board that this was not the layout of the site. The stakeholders' project manager, Paul, interjected at this point and explained that it could not be scrapped as it had been generated by the future users of the new website. This issue was only temporarily resolved and would reappear once more in the later stages of the project.

It emerged later in discussions with Robert that he was not from a web development background and that he was not able to explain this part of the methodology. This demonstrates a lack of necessary skills on the project manager's part which need not have been an issue if Chris, the developer of the IA had been present to explain how it worked. It was a mistake to attend such a crucial meeting without the required knowledge or resources and one which the developers have since acknowledged. The unnecessary anxiety caused and the inadequate explanation for the web development methodology being used at this stage placed another strain on the relationship with the developers.

Observation 3:

A dedicated Content Editor, Andrea, had been assigned to the supplier's project team for the purposes of auditing and migrating the current websites' data to the new website. At the Tender Presentations Andrea was the only member of the development team who was not present. The following describes the developers' content migration process and is exactly as it appeared on their presentation slides:

- Audit existing content
- Map to new architecture
- Identify gaps

- Images, docs and metadata
- Coordinate receipt
- Supervise addition/migration
- Review checking/testing

It is not entirely clear from this list how the task was to be divided between Andrea and the Project Board members. At the time of the presentation it could be assumed that Andrea would be coordinating the whole process. However Andrea attended only one project board meeting; the first meeting and the roles and responsibilities were not defined here.

Throughout the meeting she communicated little with the Project Board and Robert took the lead. This could be explained by the fact that Andrea was new to the company and to the role.

The volume of content which required analysis was considerable and Louise, the Head of Corporate Communications, had produced a list of everything that existed on the current sites. Pensions and Pricing were two of the largest divisions in terms of website content. This was identified as a possible risk by their Communications Leads and by Louise. Their content audit and migration was the last to be completed by the end of the project and played a part in the decision to 'go-live' *before* the user acceptance testing phase.

This was as a result of a problems with schedule and team structure; an EWS which will be discussed in a later paper. However Communication also played an important part here. The confusion surrounding when to start the task, and who would be doing which part added to the delays. Robert should have described explicitly the tasks for which the Andrea would be responsible and requested some direction with regard to the way that the Project Board would divide responsibilities. The stakeholders must also accept accountability here as they must have had some understanding of the enormity of the task ahead of them and would have been sensible of the deadlines approaching.

"Poor project status reporting to project stakeholders"

Observation 4:

The previous observations did not describe a complete absence of communication, merely that tension and confusion could have been prevented by an improvement in the quality and clarity. There were occasions when the stakeholders commented directly on the lack of communication. In the interests of fair play, it ought to be noted that phone calls and e-mails which were not made or written obviously cannot be observed or measured. Here this paper only refers to the claims of the stakeholders and to the effect on the working relationship between the developers and the Project Board. The stakeholders' Project Manager, Paul was requested to remain on the project through to the website implementation. The Corporate Secretary, Matthew, felt that the organisation and structure that Paul brought to the project was still required. A dynamic had developed between the two project managers. Paul approached Robert for project status reports and updates and put into place a structure via which they could communicate. It was felt by Paul and the Project Board members, whether fairly or not, that if this was not in place and if Paul was not engaged with the project them project updates would be less regular. Perhaps Paul's efficiency meant that Robert felt he did not need to be as pro-active. If the information was being sought on a regular basis would it ever have to be offered?

Evidence to the contrary occurred when Paul was unavailable for a week and he instructed Robert to contact Louise in his absence. Louise complained that no contact was made during this period, but that upon Paul's return Robert had claimed that they had in fact been in touch.

No empirical evidence exists to support or refute either claim. However this is interpreted, the fact remains that sufficient doubt existed with the stakeholders such that they felt the need to continue to employ Paul, an external contractor, to do many of the tasks that would normally fall to the developers' project manager. This has an effect on the budget. The responsibility falls to a project manager to develop and maintain the stakeholder's level of confidence. In this case this could have been achieved through better lines of communication.

"Communication breakdown among project stakeholders"

Observation 5:

The members of the Project Board were widely distributed across the country. Each member was a Communications Lead for their division. At times a division was represented at the Project Board by more than one stakeholder. The result was that the Project Board was larger than it needed to be resulting in longer times required for decision making, document approval etcetera. Another side effect was that the Project Board did not always comprise of the same group of people. This sometimes led to a division being represented by a stakeholder who was not 'up to speed' with the project.

Observation 6:

An informal chain of communication established itself within the Project Board, as illustrated in Figure 4. The two project managers, Robert and Paul were in contact with each other and Paul would feed information back to the Project Boards. Another link existed within this chain; Louise, the Head of Communication's role had been left undefined following the recruitment of an external project manager.

"[The role was never formally] defined as such but it was understood to be admin support and main contact within the organisation".

Louise, Head of Corporate Communications

Louise would report back to stakeholders who were unable to attend the Project Boards and would co-ordinate many of the Content Migration tasks. The stakeholders would contact Louise with any queries regarding the project and they would be fed back to Paul. We observed that Louise on occasion would not be invited to meetings between Paul and the developers or between Paul and Matthew, the Corporate Secretary. She was requested to take the minutes at the meetings she was invited to, and provide administrative support, so her role at times appeared to be that of a Personal Assistant. Louise was extremely proactive and therefore sought out much of the information, but the arrangement should have been formalised and Louise could have been a better utilised resource.

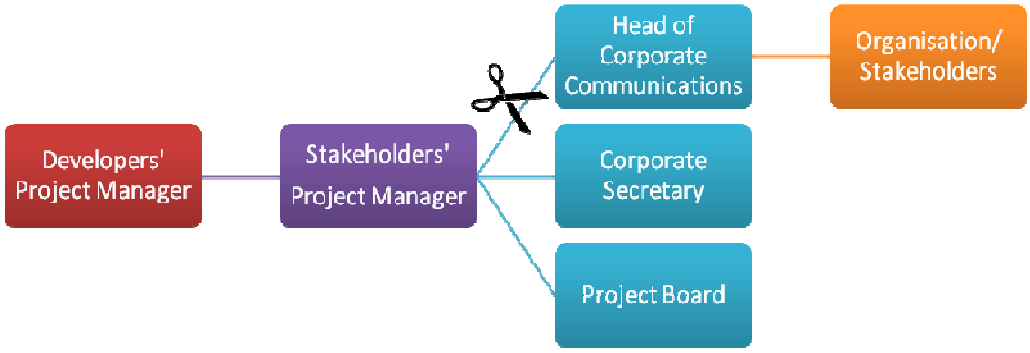

Figure 4. Lines of Communication between Suppliers and Stakeholders

"There are no project communications plans or resources devoted to managing and communicating project expectations."

Observation 7:

Stakeholders voiced concerns and notified the Project Board of issues at the Monthly Project Board Meetings. Some of the problems and concerns should have been raised earlier in the month. This was either because the stakeholders believed that the Monthly meetings were the only forum for discussions or that the project only occupied their thoughts at the time of the meeting. An improved communication structure would have provided other opportunities or forums for regular discussion throughout the month.

"Project stakeholders have not been interviewed for the project requirements"

Observation 8:

During the Tender Presentations the developers described their web methodology and described the mechanism for gathering requirements. One-to-one, face-to-face interviews were suggested in addition to focus groups of key stakeholders. None of the aforementioned took place.

"We provided them centrally with lots of information which was then circulated...[Paul, Matthew and I] were quite concerned when we saw the first version [of the requirements document] as we felt it demonstrated a lack of

understanding of the organisation so [Paul and I] met with them again in London. It did appear to take them several attempts to get it right."

Louise, Head of Corporate Communications

"Undefined project success criteria"

Observation 9:

The lack of clear project success criteria has been included as a communication EWS because of the difficulties in defining them. The PSG has no competitors and therefore to some extent, the website will be used through necessity and lack of alternative choice regardless of the end product. The user experience will be improved with a better website but the stakeholders initially found this difficult to define and measure and therefore the project lacked focus at the onset. Paul, the Business Project Manager and the developers were able to suggest ways to measure the website's success so this was resolved early in the project lifecycle.

5.0 Evaluation

The observations were evaluated against the current list of Early Warning Signs and using a survey of the literature. The literature shows that quality of communication methods between stakeholders and developers is an understudied area. (Gallivan and Keil 2003)

Poor communication can arise as a result of undefined expectations and confusion about who is responsible for managing communication. (Michalski 2000) Many texts cite good communication as being a critical success factor but divulge very little detail into its nature or quality. Those that do describe applications limit themselves to high level descriptions of requirements gathering and project status reporting.

In a survey of more than 300 information systems executives, lack of stakeholder involvement was given as the primary reason for project failure. (Engler 1996) Research suggests poorly defined lines of communication, roles and responsibilities result in the failure of communications between the stakeholders and the developers. (Amoako-Gyampah and White 1997) This can lead to a feeling of confusion and exclusion for the stakeholders and hence a reduction in stakeholder involvement.

We observed these effects in observations 3 and 6. Confusion over the role of Andrea, the content editor, meant that the stakeholders were in turn uncertain of their roles with regard to content migration. Clearly defined roles and schedules would have led to an increase in stakeholder engagement with this task.

Observation 6 is a classic example of lines of communication being undefined. Louise, the Head of Corporate Communications, was not always invited to meetings outside the project board. This led to feelings of exclusion and dissatisfaction. It was a contributing factor to her decision to accept another job offer within PSG before the end of the project. Her absence was felt in the later stages of the project as no replacement was made and her role of communicating the proceedings of the Project Board meetings to its distributed members who were unable to attend was not filled, leading to a further reduction in stakeholder involvement.

Amoako-Gyamph et al also suggests that the presence of communication and language barriers can result in misunderstandings and confusion amongst the project's participants.

One of the observations we made (observation 1) was the assumption by the developers that the stakeholder had either previous web project experience and therefore had some understanding of the methodology, or that they did not need detailed knowledge or relevant experience. The Project Board had no previous experience of a web development project, therefore until the wireframes, design and site map had been produced the process in getting to that point seemed lengthy and at times, fuzzy. The methodology was outlined reasonably well at the Tender Presentations and was one of the reasons that PSG Services appointed them as developers. If this had been repeated and documented for the rest of the Project Board in more detail and at the correct level, then stakeholder confusion would have been avoided and involvement would have increased.

It was not always obvious which EWS described an observation most accurately. Sometimes the EWS was too broad and not descriptive enough. The distinction between quality and quantity of communication was often not made and occasionally a EWS was not represented at all.

Our observations can be summarised as follows:

- Communicating at the wrong level/ Language barrier
- Project team member unable to explain colleagues progress/ Insufficient knowledge of fellow team members tasks
- Roles and responsibilities not firmly established at the beginning of the project
- Project team unobtainable/ Lines of communication not established.
- Stakeholders are interchanged without required level of knowledge transfer.
- Communication mechanism not in place for day to day reporting
- No user involvement in determining requirements.

By amending some of the EWS and adding new EWS to describe some of the observations more accurately, we arrived at the new evaluated list in Table 5. We have not removed any EWS which did not occur in this case study.

Description	**Category**
Difficulties in contacting or receiving a response from project stakeholders.	People
The development process has not been made visible to the project stakeholders.	People
Communication breakdown among project stakeholders.	People
Project stakeholders cannot come to a group decision quickly.	People
Project manager(s) does not effectively communicate with clients.	People
Poor project status reporting to project team.	Process
Poor project status reporting to project stakeholders.	Process
Project stakeholders have not been interviewed effectively for project requirements.	Process
No project status progress process.	Process
Failure to gather requirements via joint application and design.	Process
No written commitment for the project outside of the project team.	Process
There are no project communications plans or resources devoted to managing and communicating project expectations.	Process
Key stakeholders have not signed the project charter.	Process
Functional, performance and reliability requirements, and scope are not well defined.	Process
Problems Interpreting Design	Product
NEW -The project stakeholders do not know or understand the development process steps.	Process
NEW - Expectations of level of stakeholder involvement not clearly defined or managed.	People
NEW -Project manager(s) incorrectly assume project stakeholders have project experience.	People

NEW -Project stakeholders have not been interviewed at all for project requirements.	Process
NEW - Project team unavailable or unresponsive to e-mails from stakeholders	People
NEW – Language barrier: jargon used and not explained	People
NEW – Roles and responsibilities not made explicit to the stakeholders	People
NEW – Change of key stakeholders without necessary knowledge transfer	People
NEW – Project team members do not have necessary knowledge of fellow members tasks	People

Table 5. : List of Communication Early Warning Signs after the evaluation by case study

6.0 Conclusion

Evidence appears year after year to suggest that the contributing factors of project failure are extremely complex and the majority of this evidence suggests that the largest contributing factor is human involvement (Burke 2003). Lack of support, understanding, communication and commitment from both the project team and the stakeholders often lies at the root of a failure to meet scope, cost and deadlines. In addition the variety of stakeholders with different, perhaps conflicting interests has a strong influence on the actual information systems processes, which as a result do not always proceed according to a number of well defined steps (Sauer 1993).

The case study provided a rare insight into the stakeholders' views and roles in an IS project. This paper has focussed on the communication aspect of a project; an aspect widely acknowledged as being important but lacking in empirical evidence.

Most of the EWS identified within the Communication category can be prevented, but we must accept that with human involvement there is a certain amount of inevitability. A project success can be achieved by preventing what we can and developing the ability to accept and incorporate the evolution of state when it occurs, by spotting the warning signs as early as possible (Wing 1986). This can be facilitated with the development of an evaluated EWS framework for all categories.

The completed EWS framework will require further evaluation to determine how the occurrences could be measured and who by. An application to a second empirical case study viewed from the developers' perspectives is required to determine how the EWS can be measured by the project manager.

This completed body of work will provide a basis on which to suggest a model for the Early Warning System in future work.

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