

Can Personal Development fire the "Silver Bullet" in IT Delivery?

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Abstract

Do we really understand the true root cause to our IT project failures and why are we unable to replicate our project successes? Often the correction of project failings identifies processes, methodologies or procedures for the answers – the ubiquitous Silver Bullet, and it is on this basis that most University courses in Computer Science and Software Engineering are designed.

However, an analysis of literature on software development reveals that in order to create the step change improvement in IT project management delivery, we need to significantly improve the inter-personal skills of the whole IT project management team. The revolution for improved productivity will stem from challenging the typical career paths of technology learning to provide a much greater focus on the softer skills. Project management can be articulated as getting things done through people, so skilful management of team dynamics and effective communications based on an appreciation and understanding of people's behaviours will significantly improve working relationships to create an environment for success.

A large group of over 90 companies represented by E-Skills UK have designed a university course in Information Technology Management for Business which requires a minimum of 20% of students' time to be spent on personal and inter-personal skills. Graduates of this course at the 18 UK universities where the course has been offered have had a very high employment rate and are much appreciated by the businesses employing them. It is recommended, therefore, that all University Computer Science and Software Engineering courses put a greater focus on personal and inter-personal skills.

Keywords

Personal Development, IT Project Management, Productivity, IT Delivery, Soft Skills, Software Quality.

1. Introduction

The quest to find Fred Brooks' magical "Silver Bullet" [1], to improve productivity has always focussed on process or tools to achieve a step change in improvement in IT delivery. It is twenty years since the first Standish report [2], on the reasons for IT project success and failures was published. Subsequent Standish [3], [4] & [5], research into the causes for project failures continues to highlight the same topics as the contributing factors. This research also indicates that we are not learning from the past as we repeat these failings.

An analysis of the literature shows that the concept of a Silver Bullet is flawed as it constrains our thinking. A more holistic approach is needed to get products and services to market quicker, better and cheaper. A thorough analysis of project failure identifies a lack of effective soft "people" skills as a significant contributory factor. This paper provides evidence that our IT education and training programmes need to focus on these skills to eliminate our quality and productivity issues. The soft skills described within this paper are to support the goal of achieving personal excellence and this attainment will deliver a step change improvement in productivity and quality. The aspect of excellence builds on earlier work by the first author [6]. A new perspective on the latest research finding of the Standish Group [5], is conveyed as an appreciation of emotional maturity and team dynamics grows.

University courses in Computer Science, Software Engineering and related subjects form one of the main routes into software development career, so the question must be asked as to whether such courses are providing adequate development of inter-personal skills. This paper shows that where such skills are emphasised the graduates tend to be particularly successful.

2. Literature Review

The activities, methods and tools that have proved to be successful in delivering IT projects all contribute to the development of quality and process standards as shown in the case study by Radice et al. [7], as a programming process study at IBM. According to Humphrey [8], this is a significant development in the world of software quality management standards as the maturity model formed the basis of the Software Engineering Institute's, Capability Maturity Model (SEI CMM) some years later. These maturity models and other standards focus on the process aspects as the basis of improvements for delivery. However, a powerful strategy to aid adoption of any improvement systems is to demonstrate its cost-benefits and return-on-investment (ROI).

Analysis of training costs, project costs, life cycle benefits, benefit-to-cost ratio and ROI were carried out by Rico [9]. The adoption of standards has additional preparation and assessment costs. The systems assessed for ROI are Fagan's

Software Inspections [10], Personal Software Process (PSPsm), Team Software Process (TSWsm), Software Capability Maturity Model (SW-CMM), ISO 9001:2000, and Capability Maturity Model Integration (CMMI). Rico [9], concludes that due to the high start-up cost for the adoption of the standards SW-CMM, ISO 9001, and CMMI, they provide the lowest ROI. He states that the highest ROI was achieved by PSPsm, then the software inspections. The PSPsm is a discipline framework that enables software developers to plan, measure and manage their work. It sets out to create personal achievement goals whereby process quality, zero defects, and process and productivity improvements are part of every-day working culture. This standard focuses on the self-management aspects of personal effectiveness.

Successful change management programmes include new training arrangements in the new and improved ways of working [11]. Educating people and the organisation on the benefits that the implementation of best practices has and, in particular, how it will make the work of an individual that bit better will be key to that success. Training initiatives are widely acknowledged to be a salient feature of the competitive organisation's corporate strategy and, in significant change programmes, learning is an important factor for success [11]. .

According to Philips [9], and Morey and Frangioso [12], a method to assess the value of learning is to measure the performance of employees in creating items of business value from the learning. They state that for training to be effective it must have specific objectives and outcomes which directly lead to business benefit. A method to assess the value of learning is to compare the activities and outputs against a recognised industry best practice model. One such model is the Kirkpatrick [13], training evaluation model, which describes hierarchical levels to assess the benefits of training schemes. Phillips [14], extended the Kirkpatrick model to include the concept of ROI. To demonstrate ROI, the practical application of the knowledge gained from the training are converted to monetary values and compared to the cost of investment in the training and all other contributory factors. These models provide frameworks to consider personal effectiveness and the value that the individual can bring to the business.

For University education a simpler, though less direct approach to measure the value of the learning received, is to look at the graduate employment rate. This is a crude measure as a graduate's employability is not entirely related to the learning they received. Just because a graduate is employed does not mean they will turn out to be effective in their role. Nevertheless, the impression a graduate gives in their post will affect the reputation of their university course which, in turn, affects the willingness of a company to recruit further students from the same course, so there is, at least, some relationship between graduate employability and their effectiveness when graduates from a particular course are looked at as a group.

3. Background

The phrase the “Silver Bullet”, used by Brooks’ [1], first appeared in the April 1987 issue of Computer. With this, Brooks had captured the imagination of not only the software engineering world, but that of project delivery in general. The term “Silver Bullet” is synonymous with finding answers to improving all productivity and quality improvements.

At the 22nd International Conference on Object-Oriented Programming, Systems, Languages and Applications in Montreal, had as its panel discussion, “No Silver Bullet: Software Engineering Reloaded”. Fraser and Mancl [15], presented the main discussion points from the panel, providing a fresh and quite different perspective. The conference focused on people aspects and people skills; training people to be competent, teams working together, leadership and communications issues. A comment from Lopez quoted by Fraser and Mancl [15], has provided a focus for personal development: “Striving for excellence is the real silver bullet that will deliver an order of magnitude improvement.

4. Project Management – Successes and Failures

Carver and Johnson [16], in the examination of “Why Projects Fail”, provide the main reasons for why project fail to deliver the intended benefits to time and cost. These are summarised in Table 1. The main reasons are then grouped under major topic headings as conveyed in Table 2.

Table 1. Reasons why projects fail

Harvard Business School 1982	Industrial Society 2000
Inadequate definition	Unclear objectives
Scope not fully defined	Lack of stakeholder consultation
Poor or no planning	Inadequate training
Unrealistic timescales	
Ineffective controls	
Wrong leader	
Inappropriate teams	
Poor Communication	

Table 2 shows that as requirements management and planning are common reasons for project failure, the future lack of success could be predicted relatively early in the project life cycle. Team selection, including the project leader appointment, also occurs very early in setting up a project. This indicates that companies are not learning from this experience and could be avoided with effective quality assurance processes and controls. However, what this table fails to show are the

root causes to these failures, the contributory factors. Table 3 demonstrates, these root causes can be considered soft skill type failures.

Table 2. Grouping of the reasons why projects fail by major heading

Requirements Process	Planning/project management	People aspects	Ineffective Communication
Inadequate definition	Poor or no planning	Wrong leader	Poor Communication
Scope not fully defined	Unrealistic timescales	Inappropriate teams	Lack of stakeholder consultation
Unclear objectives	Ineffective controls	Inadequate training	

Table 3 Root causes and contributing factors for project failures that identify the soft skills missing in project management.

Reason for project failure	Root cause & contributing factors
Inadequate definition	The project team not spending enough time to discuss and agree the requirements for the project with a range of stakeholders. Possibly not having the assertive skills to resist the management pressure to demonstrate progress.
Scope not fully defined	As above
Poor or no planning	An inability to see the need to bring people together to plan the project and understanding the motivational and accuracy benefits of the planning process.
Unrealistic timescales	People not discussing and agreeing the realistic timescales from all aspects of the project. Possibly not having the assertive skills to resist the management pressure to demonstrate progress.
Ineffective controls	People not conveying the right project data or perhaps not having the assertive skills to highlight project problems so that issues can be resolved.

For years, the Standish Group have gathered data on why projects fail and why they succeed [2]. Table 4 presents their conclusions to the year 2004 [4]. In analysing these project failures, we can see that items 1, 2, 3, 7 and 8 relate to the process of requirements management similarly as conveyed in Table 3. Items 4, 6, and 9 relate to the project management processes. Underlying causes for failures in requirements management could centre on the lack of understanding of stakeholder management, either in terms of seeing the need to engage with stakeholders or of being able to deal with pressures from senior management to demonstrate progress.

Project successes, on the other hand, would indicate the good use of inter-personal skills to engage with users (1), achieve senior management support (2) and leading the project team (9) in planning (4), creating clarity with requirements (3) and setting expectations (5). Project success also needs people with the right skills (7) and that they are motivated to succeed (10).

Table 4. The Standish research topics for reasons why projects fail or succeed

Why do project fail?	Why do project Succeed?
1. Lack of User Input	1. User Involvement
2. Incomplete Requirements & Specifications	2. Executive Management Support
3. Changing Requirements & Specifications	3. Clear Statement of Requirements
4. Lack of Executive Support	4. Proper Planning
5. Technology Incompetence	5. Realistic Expectations
6. Lack of Resources	6. Smaller Project Milestones
7. Unrealistic Expectations	7. Competent Staff
8. Unclear Objectives	8. Ownership
9. Unrealistic Time Frames	9. Clear Vision & Objectives
10. New Technology	10. Hard-Working, Focused Staff

There is evidence that university courses are teaching project skills and are trying to give a range of project experiences [20, 21]. However, the emphasis is still on the project processes and while students do gain personal and inter-personal skills by experience, these skills are not directly taught.

Table 5. Standish Group factors of success for small projects 2013

Factors of success for small projects	Weighing	Description
1 Executive management support	20	Sponsorship, leadership
2. User involvement	15	Requirements and stakeholder management
3. Optimization	15	Team size, motivated with controlled scope
4. Skilled resources	13	Technical skills
5. Project management expertise	12	Project Leadership, knowledge and experience
6. Agile process	10	Flexible and adaptable
7. Clear business objectives	6	Business acumen and alignment
8. Emotional maturity	5	Project ecosystem, emotional intelligence
9. Execution	3	Project governance & control
10. Tools and infrastructure	1	Technical support

The Standish group have updated their research into project successes with the publication of “The CHAOS Manifesto 2013” [5]. This new research, summarised in Table 5, introduces some new terminology such as optimisation, emotional maturity and execution. Executive support (1) has the highest weighing, which would link closely with business alignment (7). User involvement retains its prominence.

The optimisation success factor (3) involves the careful alignment of project tasks to match the skills of the team, with the workload balanced for team size and capacity. There is synergy between optimisation and skilled resources (4) and further emphasises the importance of the people aspects to project successes. The emotional maturity success factor (5) covers the four aspects of emotional intelligence; self-awareness, people awareness, self-management and relationship management. The introduction of emotional intelligence as a success criterion for projects is recognition of the importance of the soft skills aspects for improved productivity and further aligns to the theme of this paper.

The success factors of the use of agile processes (6) is further supported by the research [5], that agile projects are three times more likely to succeed than the waterfall method. Many university courses now introduce agile methods in to their courses and this is to be welcomed. However, in general, this is still taught as an alternative process, the skills required to follow the agile process are not usually taught in their own right.

5 Soft Skills in Emotional Intelligence

In a study by Bharwaney-Orme and Bar-On [17], of 42,000 successful individuals, it was found that emotional intelligence is the biggest single factor for success. It was also stated that people with well-developed emotional intelligence tend to achieve more, have greater influence within their organisations and are generally more effective in what they do. As this study was conducted across eighteen different countries it indicates that emotional intelligence is not culturally dependent.

The four elements of emotional intelligence are self-awareness, social awareness, self-management and relationship management. This paper conveys some of the personal development improvement areas that would improve emotional intelligence and subsequently the successes and effectiveness described in the Bharwaney-Orme and Bar-On [17], study.

In improving self-awareness we explicitly become more aware of our values, natural talents and our motivations. In addition, a greater understanding of our team role, personalities, the way in which we communicate and the way we like to receive communication to, will all help in selecting work that fits our interests, values and natural ways of working.

To improve social awareness, we can extend the knowledge gained in becoming more self-aware, such as, personality types and team roles would lead to the enhancement of the understanding that people do work and communicate in different ways. This understanding can significantly improve team dynamics which is likely to lead to greater productivity.

Self-management can be summarised as knowing what motivates you and how best to achieve your goals. It is building on the understanding of our values and motivation to decide what we would like to achieve in our personal and working lives. The art of goal setting can provide the destination and focus to achieve. Goal setting not only allows you to take control of your life's direction; it also provides you a benchmark for determining whether you are actually succeeding. Effective time management techniques focus on greater efficiencies. However, if these skills are used well we are able to be more effectively as well, even under intense pressure. A key factor is to focus on results, not on being busy. The Pareto Principle [18], the 80:20 rule, provides a warning that typically 80% of unfocussed effort generates only 20% of results. The remaining 80% of results are achieved with only 20% of the effort.

Relationship management is working effectively and efficiently with others and getting the best out of people. It could be seen as the effective and efficient practice of the other three elements of the emotional intelligence framework, then extending into leadership, influencing, negotiation and conflict management skill development. Another framework that could be useful in developing leadership and communication skills is the utilisation of the techniques within Neuro Linguistic Programming (NLP) [19]. A principle within NLP is building rapport, a key success factor in relationship management. Also, the modelling and the copying the behaviours of successful people is conveyed within NLP teachings. The application of NLP can help people communicate effectively, think positively and create actions to make a difference.

6 Soft Skills in University Degrees

It is interesting that the topics in the last section are often covered in university management courses, but rarely in Computer Science or even Software Engineering degree programmes. Such knowledge and skills are important to employers, however. This is illustrated by the design and development of the Information Technology Management for Business (ITMB) degree [22]. This degree was designed by the collective action of over 90 companies who came together through an organisation known as E-Skills UK [23], (which became the Tech Partnership, in Nov. 2014). By examining what they really wanted from IT graduates, the companies designed the ITMB degree which has four approximately equal components of technology, business, project work and inter-personal skills.

From the analysis in this paper of the skills needs of the IT industry, the graduates of the ITMB degree should be successful IT project managers and software developers, as the emphasis on project work and inter-personal skills in their

course is much greater than students will experience on other courses. The authors can confirm that there is a noticeable difference in the students, even before they graduate. At Loughborough University the ITMB course is similar to a course in Computing and Management in terms of its academic content, but different in terms of the teaching of inter-personal skills. This gives an ideal opportunity to compare students and graduates of the two degrees. On the ITMB degree, students learn how to express an idea, communicate with others and give a good presentation of themselves, and they experience team building exercises, negotiation exercises and “Dragons Den” style presentations to real employers.

Staff have noticed how in team exercises involving mixed teams of multiple degree programmes, it is usually the ITMB student who takes the leading role. Even if not the official elected “Project Manager” of the team, it is often found that the real motivator, undertaking most of the team coordination and giving the team direction, is again the ITMB student, more so than even the Computing and Management students.

The success of the degree is also shown in the employment statistics. At Loughborough both the proportion of ITMB students entering employment and the average ITMB starting salary has exceeded that of any other IT related degree in nearly every year that the course has run. While this does not prove that the graduates of this degree will be any more effective than other computing degrees, it is, nevertheless, a good indirect measure that they will be successful.

7. Conclusion

The IT industry remains on its quest for the magical silver bullet to give a step change improvement in productivity. However, the literature review has demonstrated that our thinking has been mostly constrained to the process and technology. In analysing the root causes of project failures and successes we have conveyed the soft skill elements for why problems occur and how they can be avoided. It is concluded that the means by which a step change improvement in productivity will be achieved is to radically improve the soft inter-personal skills of all IT practitioners and leaders.

Furthermore, we have shown utilising an emotional intelligence framework for personal development in soft skills is a means by which we will significantly improve our effectiveness, decision making and productivity, as “we are the silver bullet” [15]. This paper has shown that soft skills are an un-tapped commodity in the quest for improvements.

Having determined the importance of the personal and interpersonal skills necessary to give the awareness and empathy associated with emotional intelligence, the question must be asked if university education is adequate in this respect. There is evidence that universities are giving more experience of teamwork and the real-world environment of software development, but the emphasis of the teaching is still on the processes and technology. However, the

success of the ITMB degree, introduced in 2005, with its emphasis on the development of inter-personal skills, is encouraging and shows that the companies who designed the course appreciate the importance of such skills.

In addition to the ITMB degree, the E-Skills UK/Tech Partnership companies have recently developed a new degree in Software Development for Business with the first intake in 2014, and are about to launch a “Degree Apprenticeship” in Digital & Technology Solutions, starting in the autumn of 2015. Both these degrees are more technically oriented than the ITMB, but both still emphasise the need for students to develop personal and inter-personal skills. It will be interesting to see whether the graduates of all these degrees can affect software development productivity and finally fire that silver bullet.

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