



Requirements Quarterly

The Newsletter of the Requirements Engineering Specialist Group of the British Computer Society

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RE-soundings

From the Editor

Something that Special Interest Group committees perennially worry about is whether they are reaching enough of their potential audience.

In the case of the RESG, that audience should be enormous: everybody who has anything to do with any part of the process of turning people’s needs into decent specifications, and making sure those needs are met.

Trouble is, that huge process is a many-headed Hydra.

People know parts of it as Marketing, Requirements, System Specification, Systems Engineering, Human Factors, Business Analysis, Domain Engineering, Business Process <add any keyword here>, Value Engineering and so on. (See the *RE-verberations* column in this issue on Value Engineering Explained).

And that’s just the half of it. Most of the people in most of those disciplines wouldn’t dream of coming along to a meeting about “requirements” because it’s obviously

somebody else’s clique – or more likely, simply because they never see RESG notices because they don’t recognise the word requirements because ...

It reminds RQ of the fine old Guinness advertisement, which said simply if recursively:

“I don’t like it
because I haven’t tried it
(because I don’t like it).”

The *RE-readings* report on Railway Requirements touches on the same theme: guidance documents on RE reach ... systems engineers: preaching to the converted. And they only get onto a railway project once the project has got under way, ie when a contract has been signed, the budget set, and the contractors chosen! That pretty much determines the requirements: talk of the tail wagging the dog. What would it take to get Management, Contracts, and Procurement to realise that the budget and contract should be based on the actual requirements?

Maybe there is no way to jump over that particular energy gap. But perhaps we could involve more people by choosing our language to suit a wider audience that just doesn't recognise the word requirement as anything to do with them. For that matter, the word engineering is a bit dodgy as well (see Stephen Nolan's witty report on the *AGM and RE-Fresh* event). Offers on a postcard, please.

*Ian Alexander,
Scenario Plus*

Chairman's Message

Ian's point about choosing our language is an interesting one, and choosing our language has interesting effects everywhere in RE ... or whatever we should call it. Just as we are unable to choose the right words to attract all but a subset of the people who work with requirements, so we sometimes have trouble choosing the way we communicate with the people who give us the information that we try to turn into requirements. We can find ourselves also having trouble communicating with the people who have to turn the requirements that we formulate into solutions to the problems that motivated the requirements.

I was party to a debate last week in which we all more-or-less agreed that people doing requirements engineering should be comfortable with formal representations. What we didn't agree about, however, was whether, if requirements engineers routinely expressed everything expressible in a formal notation

in a formal notation, we would avoid the misunderstandings that continue to plague projects. We agreed it might work if the customers and other stakeholders all shared our skilled-up requirements engineers' facility with formality. Unfortunately, of course, they don't. Nor do we necessarily share our customers' facility with whatever language or notation is the *lingua franca* of their domain, even when it's English.

None of the above is likely to be new to anyone reading this, of course. But I admit to being surprised that the constraints of RE's interdisciplinarity are still so poorly recognised. The reality is that engineers of all kinds routinely fall back on English (or whatever natural language they use), even for documents that will only be read by other engineers. It looks like customers and engineers are likely to remain *two nations divided by a common language* but we, as requirements people, are the envoys that try to ensure harmony.

Finally, as you will see at the end of this RQ, there are some new names on the committee and some old names that have new roles. The changes are too many to list here but let me thank the four outgoing committee members who have rendered sterling service over the last few years: Wolfgang Emmerich, Zachos Konstantinos, Andrew Stone and Gordon Woods. Thanks folks!

*Pete Sawyer,
Computing Department, Lancaster University*

RE-treats

For further details of all events, see www.resg.org.uk
Forthcoming events organised by the RESG:

Requirements: Why Bother?

Joint event with West London branch of BCS
30 October 2007
Brunel University, West London

Regional Event with IET Hereford & Worcester

7:30pm, 12th November 2007, Malvern, Worcestershire

Ian Alexander will give an evening talk on steps to better requirements. Refreshments will be provided. The event is open to all whether or not you work in QinetiQ.

Contact Tony Knight, AKNIGHT@qinetiq.com

RE Education & Training

5pm, 5th December 2007, The Hoop and Toy, South Kensington, London

This evening event looks at the problem of how we should work to improve requirements skills. Education

of university students and training of practitioners are the two most powerful interventions we have.

Can we do better? Can websites, books, conferences and discussion groups help? University teachers and industry trainers meet to compare notes and discuss new approaches.

The event will be held in the relaxed and convivial surroundings of a private room in the Hoop and Toy public house.

Contact David Bush, David.Bush@nats.co.uk

What is a Competent Requirements Engineer?

5 March 2008, London

Are there gaps between what universities, industry, and training companies consider to be the skills of a competent requirements engineer or business analyst? This invited workshop will consider what the current situation is, and will decide what action if any should be taken on a competency framework.

Contact Kathleen.Maitland@uce.ac.uk

Scenarios, Stories, Use Cases

11 June 2008, City University, London

Scenarios Day is always one of the RESG's most popular events. The morning will be a Tutorial on how to write effective Use Cases. The afternoon will be a

free seminar on the use of scenarios with speakers from industry and academia.

Contact Neil Maiden and Ian Alexander.

AGM and RE-Fresh

10 July 2008, London

RE-calls

Recent Calls for Papers and Participation

RE'07

15th IEEE International Requirements Engineering Conference, 15-19 October, 2007, Delhi, India

Particular emphasis will be placed on:

- RE in the global economy
- Collaborative Requirements Engineering
- Requirements, culture and localisation

<http://www.re07.org/>

Mastering the Requirements Process

25-27 February 2008, London, presented by Suzanne Robertson, Atlantic Systems Guild

This 3 day seminar & workshop presents a complete process for eliciting the real requirements, testing them for correctness and recording them clearly, comprehensibly and unambiguously. Delegates will learn to:

- Determine their client's needs - exactly
- Write complete, traceable, testable requirements
- Precisely define the scope of the project
- Discover the stakeholders and keep them involved
- Get the requirements quickly and incrementally

- Use up-to-date techniques such as storyboarding and e-collaboration

Visit <http://www.irmuk.co.uk/1/> for full seminar details or contact IRM UK on +44 (0)20 8866 8366 or e-mail customerservice@irmuk.co.uk

Introduction to Requirements

9-10 October 2007, The IET, London, presented by Ian Alexander, Scenario Plus

This 2 day course introduces the requirements process, in the context of engineering a system. Participants learn effective techniques for each stage of the requirements process, through instruction, exercises, feedback and discussion.

The course covers the whole process from launching the project, through discovering the requirements, prioritising, formalising, and validating them.

Throughout the course, participants learn and practise the key techniques such as identifying stakeholders, defining terms and detecting errors, omissions and conflicts. The use of tools to manage requirements is explored, along with requirements reuse.

The course is always a lively mix of explanation and practical exercises to get you familiar with applying effective requirements techniques.

<http://www.theiet.org/courses> for details and bookings.

RE-readings

Reviews of recent Requirements Engineering events.

AGM & RE-Fresh Networking Evening with Soapbox Oratory

4pm – 7pm, 5th July 2007,
The Pavilion, University of Westminster,
115 New Cavendish Street, London W1W 6UW

Report by Stephen Nolan

The 2007 RESG AGM and RE-Fresh event took place on a somewhat damp Wednesday summer (this was summer, wasn't it?) evening at the University of Westminster, splendidly organized by **Ljerka Beus-Dukic**. Arriving early, there was plenty of opportunity for networking with other RESG members, and as a

soon-to-be-newly elected committee member I was keen to meet the rest of the committee.

Pete Sawyer kicked events off with his review of 2006. We learned how membership numbers are a little down on last year, but that membership appears to be cyclical. No doubt periods of heavy demand for IT skills, such as that seen in the late 90's and early 2000's, correspond to relatively high membership – a similar effect to that seen by my colleagues in academia, who tell me that demand for places on computer science courses increased substantially during the dotcom boom. One area that seemed to me to be underexploited is industrial membership – 15 members for £100 seems a very fair price to me. I'll certainly be making efforts to sign up my organisation.

No matter – active members are what count and the RESG is certainly active. Pete reported on the highlights of the year – the Service-Centric Event at City University (which I attended) and the RESG Pub Meet, both of which were very successful in both attracting participants and in stimulating debate. The Hoop and Toy venue seems destined for a repeat as it was particularly popular and debate was particularly fierce until around 11 o'clock for some reason – our arcane licensing laws interfering with academic discourse once again.

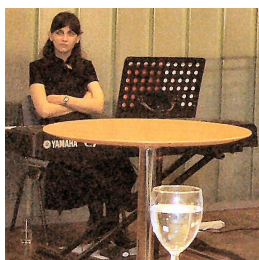
Pete then regaled us with matters financial (healthy), before the committee was re-elected unopposed, with a few new members (myself included). There was a nail-biting moment when a call for seconding from the audience went unheeded – would this see the committee disbanded? Usurped? A coup d'etat, perhaps? But no – a hand shot up and we were all 'in' for another year.

If the RESG were a company, what would we look like? Well, healthy balance sheet, great product, great team, good foundations for future growth really – maybe needs a bit more marketing.

Then a call from **Ian Alexander** for all good men and women to come to the aid of the buffet! We piled our plates and filled our glasses ready for battle to commence – the much-vaunted soapbox event!

Ivana Gavrić played the piano beautifully, lending the event the grace and energy of a live soundtrack. She is a pianist of great skill. Last year she played as "piano double" for the actress Juliette Binoche in Anthony Minghella's film *Breaking and Entering*. Juliette sat at the piano, so Ivana had to thread her hands through Juliette's to reach the keyboard, and couldn't see a thing while playing!

(See http://blogs.guardian.co.uk/culture/culture/archives/2006/05/30/hidden_hands.html#more for details.)



Ivana Gavrić

Ian grasped the pennant and headed to the front of the troops. His proposal was that the activity of this motley crew of irregulars (the RESG) should no longer be known as Engineering. He argued that requirements activities are more often than not concentrated in the early part of projects (the Discovery and Design phases) before engineering can begin. Engineering takes a precisely defined problem and builds a precisely defined solution. Requirements work takes nebulous client ideas and converts them into written requirements – not exactly an engineering process.

The floor was opened, to much debate! Ivana played a little flourish on the piano after each verbal thrust or parry, superbly expressive of the emotion in each case.



Alistair Mavin takes the floor

Representatives from Rolls-Royce were first to take arms. They firmly believed that their activities were properly called requirements engineering. **Tom Gilb** agreed. Perhaps what is key here is that the skills we possess via our training and experience are called for in many different environments, and at different stages of the project. Perhaps projects that use requirements to drive and manage product development (i.e., engineering products) call for the discipline of requirements engineering. More analytical projects may call for requirements analysis. And goal-setting at the early stage of projects may call for, um, requirements strategists? We use our skills wherever they are required, and it is this full life-cycle understanding that uniquely defines us. The common denominator here is 'requirements' – maybe we are requirementologists, or requirementographers, or requirements architects, requirements authorities – answers on a postcard, etc.

After all of this navel gazing the room needed an energy boost, so a collective visit to the buffet was in order. Plates and glasses filled, we awaited our next combatant. Tom Gilb stepped up to the breach, and with slide accompaniment, spoke to us about his requirements vision. The key is the relationships between requirements. Linear, non-relational lists of 'solution shall...' statements run into trouble because they fail to represent the relationships between requirements. Tom went one step further in suggesting that in certain situations the solution may well be better defined by the relationship than the requirements themselves. This is particularly true in cutting-edge requirementology (requirementography...?) that considers modularised requirements re-used across a product or service. This put me in mind of the following example. Consider 'a man' and 'a woman'. Does this mean anything? Does it tell us anything about the context of these people? No? But if we define a relationship such as 'siblings' or 'marriage' between them, it instantly transforms the way in which we look at 'a man' and 'a woman' because we know so much more about them. In the same way, the importance of two requirements may not be the requirements themselves but the relationship between them.

Inevitably, discussion followed among the troops. We

strayed, appropriately, into requirements management tools, as we had representatives of MKS in our midst. Of course, one key advantage that tools give us over and above the ubiquitous Excel is the ability to map meaningful relationships between requirements. However, several of our representatives from industry made the point that their tools extend only as far as Excel, Powerpoint and Word (and maybe Visio, if they're lucky), even on some very large, complex projects. There appears to be much unresolved in the tension between the aspirational and the practical in relation to tool use.

The evening progressed on an informal basis, as guests from a wide variety of backgrounds mingled happily with full wine glasses and plates piled high with nibbles. I had another engagement to attend, or I would have stayed longer to debate the evening's issues more fully. However, I was certainly encouraged by both the numbers of guests who attended, and the quality of the experience clearly demonstrated by speakers and audience alike. I will certainly attend future events – and as a newly-elected committee member, it is certainly expected! – and I would recommend that you do too!

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Formal-Lite Requirements Event

Morning Tutorial and Afternoon Seminar
19 September 2007, University of York

This one-day event, combining a morning tutorial and an afternoon talks followed by a panel, was set out to provide a light overview of state-of-the-art in formal methods and their current use in practice and research. The topic attracted a sizeable number of an industrial and academic mix of enthusiastic participants. Fittingly, the event was held in the formal setting of the historic King's Manor building in the centre of York

John Fitzgerald (Newcastle University) had a difficult task to deliver on the promise of making formal methods topic “lite” to the largely non formalist audience. After an introduction to elements of formal methods (including definitions of abstraction and rigour) using an example of a trusted gateway (no extra cups of coffee were needed!) he spoke about “Lightweight Formal Methods”. The term was coined in 1996 following the publication of several papers calling for techniques and tools which would encourage adoption of formalism without the need to tackle highly specialized technology (the papers appeared in IEEE Computer, April 1996). While formal methods were seen as prescriptive (formal specification, verification of code by proof), lightweight approach advocates abstract modelling rather than specification and machine-supported analysis rather than verification.

Drawing on his experience developing tools and methods for one particular model-oriented formal approach to system construction, VDM (Vienna

Development Method), Fitzgerald spoke of challenges faced by researchers and practitioners. As he was frequently taking the questions from the participants at some point the tutorial almost turned into a panel session. However, this means that Fitzgerald achieved the objective he set for the tutorial “be able to discuss the potential for using formal techniques in a focussed, machine-supported way in RE processes”.

Michael Jackson (Independent Consultant) began his talk by distancing himself from the formal camp and continued in a way which left little doubt why. He stressed that software engineering is about software-intensive systems that are concerned with physical world which is not a formal system. After stating that “formality is always necessary but never sufficient” he provided several illustrative examples to show that “formal reasoning about non-formal world yields unreliable conclusions”. The examples were chosen to demonstrate some of the characteristics of the real-world which makes it less amenable to formal modeling (e.g., continuous phenomena, few regularities more individual cases, no finite alphabet of the phenomena). So what do we need to reason about the non-formal problem worlds? According to Jackson we need formalization (“abstraction is a means to talking about real world”), formal reasoning about our formal descriptions of the world, and explicit interpretation of conclusions. He then spoke about how formalization process can fail and offered some suggestions how these failures can be avoided. However, the crux of his talk on “Formality and non-formality” can be summed up in his own words: “The relationship between the formality of the software and the non-formality of the problem world has a deep impact on the software development and on what we can realistically expect from it.”

After Jackson's provocative and inspiring talk in which he had challenged formalists to come with better ways of dealing with the real-world phenomena, **Anthony Hall** (Independent Consultant) had the unenviable job of convincing the audience that formal methods can play a valuable role in RE. He spoke of large projects where formal methods were applied early to write formal descriptions and used to develop systems from formal specifications.

His aptly named talk “Integrating formality into requirements documents” showed that compromise can be reached between describing requirements using natural language and formal notations in the same document. Providing that every formal statement has a natural language counterpart, Hall demonstrated that formal methods can strengthen certain aspects of the descriptions. He argued that “formal notations therefore need to be integrated into existing natural language, graphical and semi-formal description, and formal analysis needs to be combined with other techniques to explore and validate requirements statements”.

Emmanuel Letier (University College London) talked about “Goal-Oriented Requirements Engineering: Applying Formal Reasoning When and Where Needed”. First, he gave a quick overview of goal-oriented requirements engineering emphasising that it provides a semi-formal, graphical language for structuring requirements by relating them to higher-level goals organized in a refinement hierarchy, and systematic support for incrementally eliciting, modelling, and reasoning about such goal structures. An optional formal layer seamlessly integrates with the semi-formal layer to provide more precise reasoning when and where needed, i.e. on the most critical parts of the system. Formal specification patterns are used to facilitate precise modelling by hiding the intricacies of formal notations from the requirements engineers.



A Proton Therapy Machine

Letier used a proton therapy control system to illustrate how to apply a goal-oriented method and its associated formal reasoning techniques to elaborate requirements for complex systems. He also highlighted the need for a formal framework for quality goals in order to relate software quality requirements to stakeholder’s goals and domain assumptions. In his concluding remarks however, Letier admitted that goal-based RE has its limitations and that question of justifying when and where formal reasoning is needed in terms of project risks remains opened.

The afternoon talks were kept to the strict schedule to allow for an hour-long panel session which was very lively and enlightening. The questions were raised both by participants and panelists and they ranged from the more general ones (shall we replace testing with the use of formal methods?) to more particular (what is the difference between refinement and retrenchment?).

Part of the discussion addressed the issue of barriers to formal method acceptance. A frequently mentioned issue was the lack of adequate formal methods tools, in particular to enable formal methods transparency during analysis. There seemed to be a general consensus that formal methods could help in bridging the gap between the non-formal real world and the formal machine by providing means to getting *abstraction* and the necessary *rigour* (the elements of a formal method in case you forgot) into analysis and modelling earlier.

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Best Practice in Railway Requirements Engineering

INCOSE UK Chapter – Rail Interest Group (RIG), 3 July 2007, UCL

Bruce Elliott (Atkins) welcomed everyone to the RIG meeting.

Tim Armitage (Arup) explained that the INCOSE Product Development Sub-Group (PDSG) has drafted a requirements guide, and all present (and anyone else interested) were invited to contribute to its refinement. The group meets by teleconferences and email only.

Its strategy is to supplement existing sources of best Systems Engineering (SE) practice – ie not to reinvent the wheel too often. Hence the guide tries to point the reader to appropriate comprehensive sources. Where the sources do not apply well enough to the railway domain, the materials have been rewritten. The goal is to build a comprehensive handbook on the application of SE to rail.

Areas where guidance is felt to be needed include stakeholder identification and management, interfaces, requirements, division of SE activities between parties, and so on.

The chosen case study is the West Coast Route Modernisation (WCRM) which the 2006 National Audit Office’s official report explicitly says had “poor requirements”. The WCRM project grossly overran its budget as its scope continually expanded. First it covered just 2 tracks from London to Glasgow. Then it covered all the stations along the route. Then all the signalling on the branch lines that joined or crossed the route, as a failure on a branch line signal could cause an accident on the main line.

What to call the guide? Perhaps it should be “An idiot’s guide?” or “20 questions about requirements that you were afraid to ask?” It seemed to be “common sense but not common practice”: the real question was why. “The lift guide” was another idea – what would you tell someone in the 2 minutes it takes to get to the top floor, if they were starting a project and needed to get going properly?

Key advice is not to assume you know it all, to identify the stakeholders and to document their needs, to know the difference between validation and verification, and to take care to write down the rationale behind your requirements to allow for staff turnover (ie loss of project knowledge).

So, the first step was called “The Requirements Survival Guide”. It’s short, illustrated, and is in its 6th revision since 2006. It covers:

- Requirements in a nutshell
- Key concepts (a glossary of terms)
- Have I got all the requirements I need and no more? (a checklist-style list of rhetorical questions with one- or two-sentence answers, identifying

sources of guidance, and different requirement types)

- Are my requirements well written? (accuracy, necessity, feasibility, clarity, simplicity, and verifiability)
- Are my requirements well structured? (organisation, linking to other requirements and to sources, level of detail, use of tools)
- Final thoughts (maintenance of derived requirements, how to use requirements: there's no point in doing all this unless you use them to drive the project)
- Further reading.

Much of the work was in keeping the Guide short: that was difficult. It is designed to be read in 30 minutes: about 8 pages of text, not counting the pictures (which are to quite an extent just to make readers more comfortable, not to explain anything!). To avoid an ever-expanding waistline, the group insisted on taking something out if something was added! After each revision, a different member of the group took on each section, so every section has had shared ownership over time.

The tone of the presentation was on keeping the topic plain and simple. We were each given a sample page of the Guide, illustrated with a photograph of a set of railway points under an overhead power gantry. Terms like "stakeholder group", "system functions", "resolution of conflicts", "rationale" and "domain

experts" are in; "goal model" and "use case" are out. Phrases like "end-users" are still there, but other stakeholders such as maintainers, trainers "and even regulatory agencies" get a mention, along with the "budget holder". Some concepts appear in perhaps less familiar guise: for instance, scenarios pop up as the "Concept of Operations".

Bruce Elliott said that systems engineers had sometimes made requirements seem terribly abstruse, which wasn't a help. Perhaps, he suggested, we could treat it as a sales process: if at the end of that, a project manager said "oh, well if that's all you want, it seems pretty much common sense to me", that would be a success.

The knowledgeable audience gave the speaker quite a hard time, pointing out that the Guide addressed the technical aspects quite well, but by the time the systems engineers are drafted onto a project at Gate 3, the contracts with the suppliers are already set in stone with a fixed budget, all of which were put in place without any guidance on requirements! The whole cultural problem needs to be addressed. A 30-minute Guide for engineers is beside the point, said the audience: a 3-minute guide for managers would be less like preaching to the choir.

If you'd like to find out more, contact bruce.elliott@atkinsglobal.com or visit the INCOSE UK website, <http://www.incose.org.uk/>.

RE-writings

Discovery

By Ian Alexander

It is fashionable to talk about requirements "discovery" today; "elicitation" is soooo last year, and "capture" went out with crinolines, darling. It seems to cover everything from writing the project plan to getting the requirements into a database.

But really discovering a new requirement is quite special. Moments of discovery are rare and exciting. They drive projects. They change businesses.

I have in front of me the bowl and neck of a clay pipe that I found the other day on the bed of the river Thames at low tide.



Clay pipe fragments discovered in the Thames

Two centuries ago, clay pipes were commonplace: men smoked tobacco in unglazed white ceramic pipes, made of fine 'pipeclay'. The long, slender and delicate stems gave a cool smoke, and probably absorbed a fair amount of the tar, too. (Given that most people didn't live to see their 50th birthday, the danger from diseases caused by smoking was negligible.) Clay pipes didn't last long, as the stems broke easily. People routinely tossed the bits into their fireplaces; the ashes were then cleaned out and dumped in gardens or the river.



Francis Welch (1744-1790) smoking a clay pipe
Portrait by James Earl (1761-1796)

It is easy to find fragments of this simple old lifestyle: cleaved bones of sheep and cow; shells of oysters in

huge quantities; shards of pottery of all descriptions; stems of pipes.

But the pipe bowls are harder to find. One pipe might yield a dozen lengths of cylindrical stem, but only one recognisable bowl fragment. Sometimes all that is left is a tube that starts to widen slightly at one end, maybe with a few marks showing the start of an embossed pattern. Sometimes there is a definite T shape – often there was a boss below the stem as well as the bowl above. Occasionally you can see a dished shape marked with the lines where the parts of the mould met – most pipes were shaped by pouring clay into a mould. A few dished pieces are beautifully marked with leafy outlines from the better moulds.

Just occasionally there is a remarkably complete neck-and-bowl that has somehow survived the vagaries of breakage, being thrown out, the tidal flow of the river, burial, and re-exposure by dredging or digging or current flow, giving the discoverer a rare moment of surprised pleasure.

No matter that the object is green with filamentous algae, muddy, worn, and broken. It is a new find! It is exciting to examine it. Is there a pattern? Is it a real specimen or just a pebble, a piece of meaningless modern detritus? What can we tell from it? Ah, here's an interesting specimen – see, when the hole was poked through, the tool left a mark on the inside of the front of the pipe bowl, which is very narrow. And this, look,

a shard of a pipe bowl, I never saw one like this, it could almost fit into that one to make a complete bowl.

Research is said to be 1% inspiration, 99% perspiration. Most other creative activities – engineering among them – are no different. Engineering projects have their moments, but mostly they are just hard work.

The point is, of course, that the peak moments of discovery are enormously important. They're about the lost sheep that was found again: the realisation that

- the scope was wrongly understood,
- a key stakeholder had been missed,
- a simulator would be critical to the project's success.

Moments of discovery are the proof that analysing goals and stakeholders and scenarios is really worth it. They show unequivocally that requirements work saves an untold amount of time, money, and chaos, delivers better products, improves people's lives. That's what it's all about.

No matter that the other 99% of the time nothing much happened. All the procedures, the training, the patient study, the careful documentation were to enable these moments. The perspiration is necessary, but nobody will remember it afterwards.

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RE-verberations

The Agile Physician

IEEE Software's Letters page is an unusual place to find a lively article on the place of agile methods, and whether in particular they actually help customers get the right thing built.

However, in the May/June 2007 issue of *Software*, Alain Désilets of the NRC Institute for Information Technology managed to occupy ¾ of the letters column with a satirical dialogue and serious discussion of how "As a customer on agile projects, I often feel like the patient in this tongue-in-cheek dialogue with an 'agile physician'".

Physician: Good morning, Mr Brown.

Patient: Good morning, doctor.

Physician: What can I do for you?

Patient: Well, this lump recently grew at the back of my skull. Since then, I often feel dizzy and have violent headaches.

Physician: Sounds like you might have a big problem. What treatment would you like us to perform on you?

Patient: Huh? I was hoping you could tell me that.

Physician: I see This is your first time consulting an agile physician, isn't it?

Patient: Yes.

Physician: I can tell..... My role as agile physician is limited to expertly doing exactly the treatment that you feel is right for you in a timely and cost-effective manner. Isn't that great?

Patient: I guess so ... but what if I choose the wrong treatment and die?

Physician: We'll still get paid.

Patient: But I'll be dead! That's a big concern to me. isn't there *anything* you can do to help me figure out what's good for me?

Physician: Oh yes, absolutely! We realize that making this kind of decision is very hard, so we take an iterative approach. You choose the treatment that you think is most appropriate ... and then we do a little bit of it. We do the SmallestBitOfTreatmentThatCouldPossiblyCureYou. Then *you* get to evaluate if it worked or not.... Makes sense, no?

Patient: I guess so.....

And the quack goes on to explain how it also helps to estimate the cost; both agree that money is important to them. The dialogue ends:

Physician: Surgical removal of the lump is about \$1,500. Acupuncture, biofeedback, and meditation lessons are in the \$50 range per session. Bloodlettings are free.

Patient: Hmm, I don't think I want to go for bloodletting.

Physician: Your call.

Patient: But I'm not sure I want to go for the more expensive treatments at first. So, I'll go for the regular x-ray at \$500.

Physician: Sounds reasonable. If you go into the next room, my assistants will start treatment right away.

Patient: Thanks, but I feel kind of ...

Physician: Empowered? Yes, I know.

It's all hideously believable in a world where the air-headed can get almost anything on their credit card. The implication is that agile is fine for software developers, but a bigger inquiry cycle, as in user-centered design, is needed to give the customer enough information to make valid decisions to guide development iteratively.

Relevant books (reviewed on scenarioplus.org.uk):

Alistair Sutcliffe, *User-Centred Requirements Engineering*, Springer 2002

Hugh Beyer & Karen Holtzblatt, *Contextual Design*, Morgan Kaufmann 1998

Ivy Hooks and Kristin Farry, *Customer-Centered Products*, Amacom 2001

Value Engineering Explained

The BBC's wonderfully lucid Economics Editor, Evan Davis, has turned his hand to RE, or at least to its economy-flavoured cousin, Value Engineering (<http://www.bbc.co.uk>, Notes on Real Life, 21 May 2007, 10:20 AM).



No Shampoo in the Bathroom

Davis explains in his usual inimitable style:

" If you've ever stayed at a Travelodge Hotel, you might have noticed they don't have shampoo in the bathroom. Well, that's 'value

engineering'. It is a phrase you might want to remember, as it governs your life more than you know."

Travelodge's website explains VE like this:

"Pay for things you don't want? That's crazy! Our research shows that most people staying in a hotel simply want a clean, comfortable place to get a good night's sleep, and are happy to forgo the unnecessary "frills" offered in other stuffy, over-priced establishments. So we make sure we provide good quality essentials such as a comfortable bed and a decent quality shower, but get rid of unnecessary extras."

http://www.travelodge.co.uk/good_value/#question1

The web page makes interesting reading, whether from the point of view of the company's philosophy, why other hotels think it worth having miniature bottles of soap, shampoo, and body lotion in the bathroom, and of course on VE generally.

According to Davis, someone has

"engaged in an exercise – formal or informal – called value management to optimise their processes, trim costs and enhance quality."

In big companies they do this in a structured way, engaging consultants in a fairly scientific process using so-called FAST diagrams. In small companies, they do it more haphazardly, maybe sitting in a VE workshop, with key designers and contributors throwing in ideas."

VE was invented by General Electric during the second world war. Basically, it is the task of asking what a company's real goals are, and how it is going to achieve them. As such, it's yet another partial synonym for RE (does anybody have a list of these? We should keep one).

"At its narrowest, value engineering is about paring costs. ... It's the Travelodge shampoo experience."

Davis goes on:

"Note that value engineering is not (in principle) just about delivering the cheap and cheerful.

Upmarket hotel chains will always decide to offer shampoo, but they also need to think about value. ...

Value engineering is only a means of implementing a very basic concept of economic welfare: that you improve welfare when what you do costs less than the value someone derives from it. Should a hotel supply shampoo? Yes, if it costs 10p and the hotel customer values it at 11p. No, if it costs 10p and the customer values it at 9p".

This is obviously difficult if neither you nor the customer actually know the value the customer places on the stuff.

What is clear is that cost versus benefit means knowing (and tracing to) customer requirements, accurately. The usual sort of cost-cutting where people just cut anything costly that they don't understand the reason for is VE only in name.

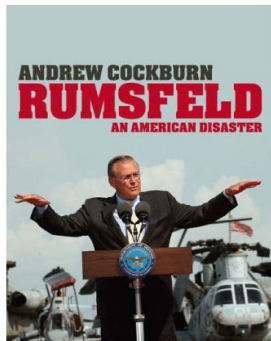
To sum up:

“Cost versus benefit. It should run through every business decision.”

That puts quite a different complexion on requirements prioritisation, doesn't it? Would large software packages have quite so many features if all of them were subject to VE? Then again, the real priority may be marketing, to claim new features and being ahead of the competition.

***RE*-flections**

Learning to Drive, the Rumsfeld Way



Rumsfeld: An American Disaster,
Andrew Cockburn, Verso Books 2007

Back in 1971, Donald Rumsfeld was described by Richard Nixon, never a man short of a pithy epithet, as “a ruthless little bastard”, according to Andrew Cockburn. The former secretary of state for defense is famous in another way too: for confusing the world's chattering classes with his solemn pronouncements on Unknown Unknowns. Some supposed him to be merely babbling; the more cynical imagined him to be intending to impress and confuse.

Many years ago, I heard a lecture at a School of Education (don't ask). The professor gave the picture of a boy racer advancing his knowledge of automotive control through four stages.

1. First, he jumps behind the wheel – whether it is his father's car, or a stolen wagon, history does not relate – and overconfidently roars up the road to a crashing finale. He is unconscious of his ignorance of all matters vehicular.
2. Then, sadder and a little wiser (broken collarbones do take some weeks to heal), he tries again, a little more carefully. This time, he manages to get around a couple of corners, and to stop with a squealing of brakes before the journey comes to an end – whether through the good offices of a police patrol, or because it's the turn of the next member of his gang, you may decide. At any rate, he is becoming conscious of his own lack of knowledge.

3. His parents having become aware of the need for, shall we say, more formal driving tuition, the boy now finds himself in the driving seat of a car with dual controls, beside an instructor. The car is embarrassingly under-powered, and decorated with large red L-plates on every surface. The boy now steps gingerly through mirror-signal-manoeuve and “line up the middle of the rear window with the kerb when reversing”. He is consciously acquiring the rudiments of driving.
4. Finally, we see him seated happily behind the wheel of a small car, a pretty girl in the passenger seat, and some lively music on the car's cheap-and-cheerful tape player. He is chatting in a relaxed way to his companion. He is unconsciously skilful in his handling of the car.

Ah... unknown unknowns, known unknowns, known knowns, and finally unknown knowns: it does make some kind of sense, Rumsfeld or no. What is interesting about the learning process that this epistemology implies is that the highest level involves a return to unconscious behaviour, but this time it contains the necessary knowledge.

Biologists have an explanation for this surprising point of view: programs or scripts of skilled and practised movements are recorded in the cerebellum, and retrieved effortlessly, faster than they can be described or even thought. That speed is necessary for skilfully co-ordinated movements of many muscles. Any traditional craft, indeed any practised movement like picking up a glass, involves a great many subtle operations performed smoothly and at speed – as robotics engineers have discovered the hard way.



Toumani Diabaté, Kora Master

There is a wonderful recording called *In the Heart of the Moon* that exemplifies precisely the end point of this process. Two musicians, both from Mali, but from very different traditions, meet for the first time, and in three two-hour sessions complete a perfectly finished album. Ali Farka Touré was the master of the blues guitar; Toumani Diabaté is the 50th generation of a family of griots, professional Kora players. Both men were aware of the other's music.

They sit down together; Ali plays the first few notes of a melody, and Toumani, with nothing more than a grunted call of synchronization, starts to improvise a beautiful accompaniment and ornamentation. Toumani's fingers dance all over the Kora at a speed that is dazzling, luminous. Ali shows that the guitar can be relaxed, mellow, exactly in harmony with a traditional instrument and style of play. Between the two of them, they create just the musical dialogue that they intend, seemingly without effort. One can only wonder how many thousands of hours of practice and observation were needed to reach such a peak of creative ability.

The highest knowledge is not theoretical head-stuff, but useful practical skill, perfectly relating a situation to the actions it demands. The theory of motoring should inform practice, but it is practice – safe motoring – that puts theory to the test. It is actual driving which is the fruit of all the study of the Highway Code. The

academic certainties – the known knowns – are subservient to skill.

If your organisation thinks it knows best, and is contemptuous of ideas, methods and techniques developed outside, whether by industry or in academia, then you are at stage 1: overconfident youth who thinks he knows it all; unconscious ignorance.

If your organisation is still experiencing projects that squeal to a halt, fortunately just short of disaster; or if your colleagues admit they enjoy fire-fighting (rather than completing projects smoothly) you are at stage 2: boy racer getting the rough feel of the car.

If your organisation is carefully putting CMM-compliant processes into place, you are at stage 3, conscious knowledge: or L-plates, to put it more plainly.

And if you are lucky enough to witness a group of engineers quietly getting on with their work, each doing just what is necessary, without endless discussions about process or status meetings or management-speak, enjoy your good fortune. You are watching a skilled team operating, seemingly effortlessly, at stage 4: masters of every technique in their craft, including teamwork.

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RE-partee

Have Someone Read You This



failuRE-definitions

- PLOKTA – Press Lots Of Keys To Abort
- Escape Key (ESC) – key that does not let you escape from software hangups, printing enormous documents that you realised you didn't want a moment too late, or from trying to communicate via an overfull network (see PLOKTA)
- Fault (1) – something that goes wrong with a new bit of hardware when you spend too long trying to understand all its functions, as in “If you play with anything long enough, it breaks”
- Fault (2) – something that goes wrong with an old bit of hardware when it finally kicks the bucket,

pops its clogs, or otherwise has its memory bits latch to 1111111111111111...

- Fault (3) – design error permanently hard-coded into software, as in “else {/* got to go to lunch now, must code something here */}”
- Failure – someone who never gets invited to work on projects, so has to work in the software process improvement centre of excellence instead
- Technical Fault – the driver has not finished eating his sandwiches
- Human Error – unexplained Fault (q.v.) in flight control software
- Intermittent Faults – the system admin team are going out to eat their sandwiches
- Recursion – see Recursion
- Stack Overflow – the pile of unwashed coffee cups in the system admin kitchen has now filled the sink and surrounding area
- Buffer Overflow – the beer tent is full and the chaps in blazers are having to stand outside and watch the cricket

Humon Error (sic)

According to the July issue of the IET's Engineering and Technology magazine, workers are the biggest security risk for computer networks.

“Human error is by far the biggest risk for computer network security, with carelessness with passwords costing businesses a fortune in theft and fraud.”

Carelessness with spell-checking is of course not usually quite as expensive, semi-colons in Mars lander software excepted.

RE-sources

Books, Papers

RQ archive at the RESG website:
<http://www.resg.org.uk>

Al Davis' bibliography of requirements papers:
<http://www.uccs.edu/~adavis/reqbib.htm>

Ian Alexander's archive of requirements book reviews:
<http://easyweb.easynet.co.uk/~iany/reviews/reviews.htm>

Scenario Plus – free tools and templates:
<http://www.scenarioplus.org.uk>

CREWS web site:
<http://sunsite.informatik.rwth-aachen.de/CREWS/>

Requirements Engineering, Student Newsletter:
www.cc.gatech.edu/computing/SW_Eng/resnews.html

IFIP Working Group 2.9 (Software RE):
http://www.cis.gsu.edu/~wrobinso/ifip2_9/

Requirements Engineering Journal (REJ):
<http://rej.co.umist.ac.uk/>

RE resource centre at UTS (Australia):
<http://research.it.uts.edu.au/re/>

Volere template:
<http://www.volere.co.uk>

DACS Gold Practices:
<http://www.goldpractices.com/practices/mr/index.php>

Software Requirements Engineering Articles (India):
<http://www.requirements.in>

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Requirements Networking Group (RQNG)

www.requirementsnetwork.com

RE Yahoo Group

<http://groups.yahoo.com/group/Requirements-Engineering/>

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To contribute to RQ please send contributions to Ian Alexander (iany@scenarioplus.org.uk). Submissions must be in electronic form, preferably as plain ASCII text or rtf. Deadline for next issue: 7th December 2007

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