When the landscape keeps changing: scope creep in repositories

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ABSTRACT: All the literature in repository planning says you should be really clear about the purposes and scope of your repository because that will drive the decisions about how you set it up (and other things too). However, it is really easy to be diverted/overwhelmed/inveigled into ending up with a repository that has quite different scope and purposes. This presentation will discuss the pressures, dilemmas and consequences involved in the above scenario, will use examples from my USQ ePrint experience, and suggest some solutions. I don't pretend that I have universal answers, but our problems and our ways processes to resolve them may help some of you with similar issues.

I also want to give a disclaimer that these are MY opinions, and not that of either USQ or my present or former ePrints colleagues.

Defining the Space

Let's start by defining the terms "*scope*" and "*objectives*"

Scope is a statement of the area of responsibility, the boundaries of the system, what the box should be like in terms of dimensions, materials etc. So for instance, ePrints scope was USQ authors only, output of a scholarly nature,

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[1] This version of the paper does not include the graphics that were included in the presention.

preferably but not necessarily published or refereed (but where those dimensions would be very clearly shown to users)

Objectives state what to achieve and the specific end result desired. They must be specific and measurable and identify the business problem that is being solved. The vegetables in the box represent objectives, ie what you wanted, ie a meal.

Scope and objectives are interrelated. If the scope changes, then the objectives necessarily do too. And vice versa.

If scope creep were allowed at the Pizza Parlour: instead of a pepperoni pizza, you may end up with a pepperoni plus pizza, pulled out of the oven 3 times to add anchovies, olives and chicken and you ask for a second one when Uncle Fred turns up unexpectedly. But since you have to cook the chicken first, you get burnt cheese and underdone chicken – and you forgot to put the tomato sauce on the second one. In the end, both pizzas taste dreadful, the extra ingredients cost three times the original price, and you've annoyed the hell out of the Italian guy with the gun who cooked it.

Wikipedia, that infallible source of all wisdom and accuracy ☺ , defines it as "uncontrolled changes in a project's scope. This phenomenon can occur when the scope of a project is not properly defined, documented, and controlled." That's a start, but it isn't very helpful in getting to the root of the problem or what the consequences are.

Wideman widens that by saying that scope creep occurs when "On-going requirements increase without corresponding adjustment of approved cost and schedule"

That is, there is a change that isn't fully accounted for. This definition is better, because the results of scope creep are at least hinted at.

Barry et al describes scope creep as growth of projects while in progress, and stress that it is highly likely to happen in small doses, incrementally, without project leaders being aware of the significance of the changes or allowing for cost and time consequences. So the key words are: *increase, in progress, incremental, uncontrolled.*

One of the oldest jokes in project management is that "here is no such thing as scope creep, only scope gallop." Another, somewhat cynical definition is that scope creep is the natural process by which clients discover what they really want" (Suresh). I like this one, because it gives a human dimension. It also shows that there are at least two sides to every story: for every repository

manager, a client; for every client, a repository, to mangle Ranganathan somewhat.

With this definition, as a project gets under way and plans start to become real, the client will often say

> "That's not really what I *meant*" or
>
> "Or if it is, that's not really what I *want*"

There are 2 types of creep described by Suresh that provide useful psychological insight:

- Technology scope creep: firstly,
    - Technical staff who add functionality or 'fiddly bits' that seem to improve the software , but that weren't originally specified, because they are perfectionists or kind-hearted (also known as "Gold-plating"); secondly,
    - where the repository team wants to please the customer and is reluctant to say "no" to a change in requirements (Suresh)
- Business scope creep, where
    - the client doesn't know what she wants, or
    - knows what the end product has to do but has NO idea what is required to achieve it.

Scope creep is most likely when the scope was never clearly defined in the first place. If new requirements are proposed, rejected and resurface later- with ongoing debates about whether they belong in the system- the scope definition was probably inadequate to start with. (Wiegers)

USQ Case Study

The following is one small example in USQ ePrints of a combination of client innocence/ignorance and desire-to-please. The University of Southern Queensland uses the open source ePrints software and launched the service publicly in July 2005. It now has almost 800 deposited items. While we have a warm and useful relationship with RUBRIC and are a formal partner, we have not yet chosen to adopt one of the RUBRIC-sponsored platforms.

We decided early on that we needed a relationship with the University's office of Research and Higher Degrees, henceforth known as the Research Office. It quickly became a 'good idea' to enable ePrints to be the single source for DEST-reportable data. Obvious really – single source of data, easy input mechanism, with lots of open access 'byproducts'. Nooooo – it turned out after several months that about 10% of the desired data wasn't in ePrints and ePrints staff didn't know. The Research Office folk used to manually add up the percentages, using their acquired knowledge of USQ researchers. We'd had numerous discussions with them to tease out their requirements. However, clearly we

hadn't asked the right questions - or had and hadn't appreciated the significance of the answer.

What did we do? Writers on Project Management tell us to define business requirements as 'must-haves' and' nice-to-haves' ; document thoroughly areas that are and aren't included in the work to be done; institute a formal Change Management process, with Enhancement requests, regular upgrade schedules; impact analyses where cost and time for new requirements are applied to any signoff decisions on changes. That is, impose a discipline on the client relationship.

In practice, what did we do?
We started off by doing most of the above approved measures. Then we applied a dose of 'customer-pleasing'. We changed our approach and made changes – BUT so long as they didn't affect the underlying data structures. This has worked because we can provide changes that work around the edge of the software and don't affect it's core. We've tried to give the client (key Research office staff) a visual walk-through with a prototype of the desired changes. We've added extra data, created cover sheets for HERDC collection in 2006, and in doing so, helped the client achieve some important political objectives. And we also helped ourselves, by creating the perception and reality that ePrints can genuinely help clients solve their problems. Those who heard Susan Gibbons earlier this year will recognize the approach (Gibbons 2006).
It's not been a pure process: some time and data compromises and back flips have been made. But we are both happy, despite having created scope creep.

Another example: the Research Quality Framework

When USQ planned ePrints, the RQF was vaguely on the horizon, but faint, ill-defined and a LONG way away.

The stated purposes of ePrints were and still are

- To provide the Library with a suitable platform for storing, archiving, preserving and making accessible "born digital" output of USQ staff and students
- To provide USQ staff and students with a platform for disseminating and preserving their intellectual output
- To increase the visibility of USQ research.

The primary objective is to expose and showcase the intellectual output of USQ. To do this, our collection development policy was broadly defined, stressed open access, making material widely available via harvesting.

Then RQF and also the international push to mandate deposit into open access repositories. Suddenly it seemed, we were under pressure from the senior Research managers to be the single source of University output, with high standards of metadata and data quality, extremely timely, comprehensive and with excellent import./export capabilities. This was classic creep and still has the potential to create resourcing issues!
We'd not intended to be
- A single source of publications
- Providing portfolio software: rather we were contributors to the portfolios of academics.
- Storing the authoritative, published version of papers. We were geared towards open access. Therefore we live with the limitations of current publisher copyright policies and make available author's versions of papers. We have been under increasing pressure from some USQ academics to store published authoritative versions. However, a closed access repository, such as Monash has, was foreign to us.

I think the solution to this one lies in management of expectations at senior political levels. Expectations have been defined as the difference between what the client wants and what they really need! We have not been as successful in this process as is desirable. However now, with a new PVC Research who is one of ePrints authors and who strongly supports our objectives, and the probable upgrading of resourcing for our Research Office do I feel that we can manage those expectations effectively. It takes self-discipline by the repository manager to say NO to a very senior academic or manager when giving in would bring short-term peace. I can say truthfully that I don't always succeed.

I produced a case of creep myself one day when, thinking out loud with a research manager, I suggested construction of pre-populated DEST cover sheets for HERDC collection. Six months later, we are about to have a product that will be used and useful, but it was yet another distraction for our systems team, and may have been avoided had additional expectations not been created.

Can USQ ePrints respond to the scope changes suggested by RQF? Well, maybe, but changes in our mission will inevitably reduce the effectiveness of what we think we currently do very well – ie to open up access to USQ research and other intellectual output. It's the University as a whole and particularly the Research Office that has to respond. We are not sure whether we can meet all desired purposes – and maybe we shouldn't even try. Or become cleverer by creating much more interoperable databases?

So why does it happen?

Perceived relative importance of risk	High	1 **Customer Mandate**	2 **Scope & Requirements**
	Moderate	4 **External Environment**	3 **Execution**
		Low	High
		Perceived level of control	

From: Keil, et.al, 1998

Keil and others apply a time-honoured business strategy technique of quadrant analysis to discover risk factors that affect scope creep.

In this typology, controlling scope creep is critical to the success of the project- high importance and high control. If control drops then the need is to beef up the customer mandate.

In the lower left hand quadrant, Environment experiences moderate relative risk, but has low control. The RQF is an example of this. If you think that scope creep is bad then the RQF is an unwelcome diversion and you'll try to move the degree of control into the lower right quadrant, with the IT/execution. If you think it's natural, then it needs to move up, to quadrant 1, where it presents an opportunity for the Library to get closer to its academic clients.

Keil also investigated self-justification theory. This suggested that individuals can rationalise their previous behaviors to explain runaway projects, essentially applying defensive strategies.

Barry and others developed a model relating effort required in a project to its duration. Instead of blaming inadequate estimation models and incomplete requirements analysis, they say that longer project durations contribute to greater project effort, over and above the effects of size, team skill and other factors. The longer a project continues the more likely the environment is to change. Therefore small, linked or phased projects are suggested.

Another reason is lack of political will at the original, scoping stage. USQ ePrints was very lucky here – we had strong leaders with clear vision at the conceptual stage (Madeleine and Deidre Lowe) , a lack *at the time* of competing visions (Research DVC RQF et al), and a keen sense of 'just doing it' – risk-taking,

acceptance of possible failure and willingness to prototype and try out. Absence of any of these could have produced much more major scope creep very easily.

What are the consequences of creep?

For USQ ePrints the most likely outcomes were:
- **Time and budget blowout**: as systems people try to make everyone happy, testing environments become progressively more messy. Also the consequences of having to re-do work, document changes, and negotiate with your committee, sponsor or funding sources can cost valuable time. A determined cynic quoted that old chestnut at me "After all, a badly planned project will take three times longer than expected - a well-planned project only twice as long as expected."
- **Inability to focus**, which causes loss of momentum
- **Inability to meet basic objectives** because of pursuit of additional ones first
- **Staff and user frustration**, when promised schedules slip

All of these can be very bad and we've experienced all of these at some stage!

ePrints experienced a creep issue with our 4th year undergraduate Engineering projects, when concerns about the intellectual quality of some work, only partly anticipated in our Collection Development Policy, threatened to slow down the entry process. We had a solution, to refer issues to the relevant Faculty Dean. The result was the addition of a couple of extra metadata fields to the deposit process, and the need to re-enter a significant number of items. This was a small issue, and didn't hold us up much, but then, that's one of the characteristics of scope creep, little things add up. And it did cause us to re-visit our Collection Development Policy.

Are there solutions?

1. Planning and more planning at the beginning. This is the classical, technical solution. How?

- Establish a baseline list of must-haves' and nice-to-haves', and agree on a clear and unambiguous definition of each requirement when they approve it, and understand the TOTAL cost of making changes in the future.
- But baselines will change: so freeze the definitions and objectives and say when you are going to do it. "Speak now or forever hold your peace" But when do you do it? It's hard to do:
    - Freeze too early and clients may not like the product
    - Too late and client may not like the cost and timeframe....
- If the final sign-off on the requirements documents is just a game or a meaningless ritual, then it is very likely that a continuous wave of changes will

batter the project. They'll come anyway when you are into production phase, but try to reduce them at the building stage.

There's an old story about a little girl who was asked to spell the word "BANANA" " I know how to spell it, " she said, " but I just don't know when to stop".

2 Were the scope and objectives valid at the time? If so, then stick to it. Changes must be in accord with the primary goal of the repository. This will keep the site focused, organized and cohesive. USQ ePrints has been urged to become a last-resort data archive for USQ, more than its primary goal of opening access to USQ research. We've stuck to the primary goal, and our academic community is thanking us for it.

Should objectives be changed? In the longer term, YES, IF the University as a whole agrees and IF the resources required to make that change are available. But just tacking another requirement on, with no additional resources is a recipe for pleasing no one!

3 Use prototyping as an alternative to baseline-freezing. i.e don't work to a predetermined rigid final product. Do the work in stages, each of which has their own objective. So if where you finish isn't where you started off thinking you were going to, then you may still have produced a better solution for the repository. For instance, we started, not with the full spectrum of item types, but with Engineering projects, that enabled us to building the ePrints configuration gradually, adding data fields and getting experience with workflows. This required imagination about the final product needed to be like but not having to get it right immediately.

4 Some outside changes and pressures MAY need to be built into objectives. Multiple phases designed from the outset will help- each phase having limited objectives. We may decide to implement a second database and interchange data. Or more. But we won't completely change our objectives- there's a big difference between gradual improvements and a complete change of purpose.

Build buffers of time and budget into the repository plan to accommodate possible change in time and cost, and therefore accept that some changes will need to be accepted. That's just sound risk management!

5 At the end of the day, it has to be a **balance between firmness and discipline,** and flexibility and forward thinking. There is no point in having such a rigid view of the past that you become incapable of change. There are bad precedents for this, as John Clease in Falty Towers amply demonstrates.

6. Scope creep can be controlled much more effectively if your repository governance is right. Committees need a mix of sympathetic supporters, technical staff who are good listeners and at least one control freak with an insistence on budgets documentation and timelines. One or two neutral people who may ask "Why" at inconvenient moments don't hurt either. ePrints was very lucky again – we had a beaut Steering Committee.

We've always had people who could say "no!" or "stop – enough"!

Finally, understanding the culture of the people who the repository is serving, what problems they have that the repository is solving but being honest and realistic with them about the ability of a repository to do that is really important.

We should look to scope creep as an opportunity to improve the relationship, without tearing the [overall cost] envelope for the project."(Blain) The trick is in finding the boundary of that envelope, after which we can then apply the more formal techniques above. They are good techniques, but they aren't the most important thing to focus on. My experience with USQ ePrints, with the numerous times that scope creep has threatened to 'beach' or at least waylay the achievement of our goals, tells me that the trust relationships we forge with our repository constituents makes the critical difference.

So I view scope creep as creating the **necessity** to forge better trust relationships, and demonstrate amidst the shifting landscape our discipline and superior planning skills but also our flexibility and relationship skills!

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