

# Thoughts on the Portability and Integration of Knowledge

Ceri Williams, Sunday morning 25/1/04

## Personal Context

I've been pursuing the idea around transplantation of knowledge between domains for some months now, the vastness of the topic means I can only sensibly focus on the integration of 'stuff' (e.g. values, behaviour, artefacts, people, ideas) into a foreign environment. It is hard to focus on this subject without also considering the integration that takes place between ideas themselves and the features of the environment that promote this integration. So, for the last couple of months I've been viewing a lot of things, including the discussions in the Monday group from the point of view of integration and how to enable & promote it.

Friday night after a couple of glasses of champagne to celebrate my wifes acceptance into the Responsibility and Business Practice course at the University, I was reading some of the starter literature about Action Research and had one of those 'lightbulb' moments. Now, this could either have been a moment of profound insight, a belated realisation of the blindingly obvious or an illusion, but a number of thoughts came to mind that I think are worth writing down and seeding for discussion. So here goes...

## Historical Context

From what I understand, the ideas behind Action research were a response to the perceived shortcomings of the traditional academic research process, where a researcher would pull together information from a variety of sources and go through a process of collation, selection and abstraction to produce 'knowledge'. Often this would take the form of a document that could then be filed in a repository and retrieved by others. One of the perceived shortcomings of this model of knowledge harvesting, distribution and application was that the material failed the 'relevance' test in the users domain, and was hard to integrate into that persons daily practice. The proposition of Action Research is to achieve two objectives not met by a traditional approach - relevance and integration. If the person doing the harvesting the knowledge is the same person applying it you are pretty much guaranteed relevance and integration. The producer and consumer of the knowledge are well aligned as the consumer can use his or her own objectives to directly focus the harvesting of knowledge from their own domain. That is not to say that the practitioner does not bring in more abstracted forms of knowledge created using traditional techniques.

This is analogous to what in my days in industrial control systems we would call 'closed loop' activity, where feedback and iteration in the production and consumption of control signals (i.e. information) are closely coupled needing minimal interpretation.

## Domains and Portability

Relevance and integration are not the only properties that determine the value of knowledge, there are some others that have a major impact on this, including the extent to which the knowledge generated is applicable in other domains (commonality), the ease with which it can be adapted for other domains

(portability), the number of domains that it can in theory be applied to (reach) and the speed with which it can be communicated/disseminated (velocity). From my own domain, I can easily imagine that many of the engineering design properties we strive for in Information & Technology Architecture could also be applied to knowledge- some of these include robustness, resilience, adaptability, flexibility, extendability, stability, longevity, integrity, availability, manageability, visibility..the list goes on.

So, what is the significance of this? It could well be that there is a direct trade-off between relevance & integration and the other properties of high value knowledge - portability, commonality, reach, velocity etc. It is also possible that this, by its nature is a 'natural' tradeoff, rather than a result of any paradigm. The reason I think this may be the case is that portability is effectively achieved through abstraction- in the absence of abstraction, the knowledge remains so bound/coupled to its originating domain, that any potential consumer first has to decouple it before applying in their own domain. Either that or their domain is so similar to the original one that the knowledge is not really crossing domain boundaries. The cost of abstraction is the complexity of integration into a new domain- the knowledge has to be adapted, extended, refined, aligned etc with the new domain to be effective and be able to take root. My profession is littered with cases where highly abstracted ideas for management, organisation, and software development were not integrated into the new domain, either because they were inappropriate in the first place, or the sponsor thought they could accelerate the adoption by skipping the integration phase either deliberately or through ignorance.

Assessment of relevance to the target domain can only be judged through the imagination of the person applying it, who has to use their own powers of abstraction to mentally bridge the gap between concept and application before selecting the concept for use, based on a judgement of potential value and ease of implementation. The knowledge can only be given meaning and value delivered through the binding of the abstract knowledge to individuals through experience- individual learning events

### **Implications**

So, maybe integration has to be assured through the knowledge harvesting process or achieved during application. Action Research may be a method to promote integration through focusing the harvesting, but cannot comfortably deal with the integration during application if it is outside the domain (person) from which it came. That is not to say that traditional academic research is any better at this, because it is only really focused on production of abstracted knowledge rather than integration and application to daily practice.

It may be that an enabler of cross-domain knowledge transfer is abstraction because this is how common ground can be identified and articulated. Individuals in the new domain need abstraction to be able to see the wood for the trees by filtering out the idiosyncrasies of the origin. Propagation of the knowledge is inhibited by the need for domain knowledge in order to put it into context and give it meaning. Abstraction though is an inhibitor to integration because it is never clear how someone can translate it into practice. This is a common problem in large-scale IT governance, the IT director says "we shall use the service-orientated paradigm for all architecture & design" and the practitioners on the ground say "so what" and

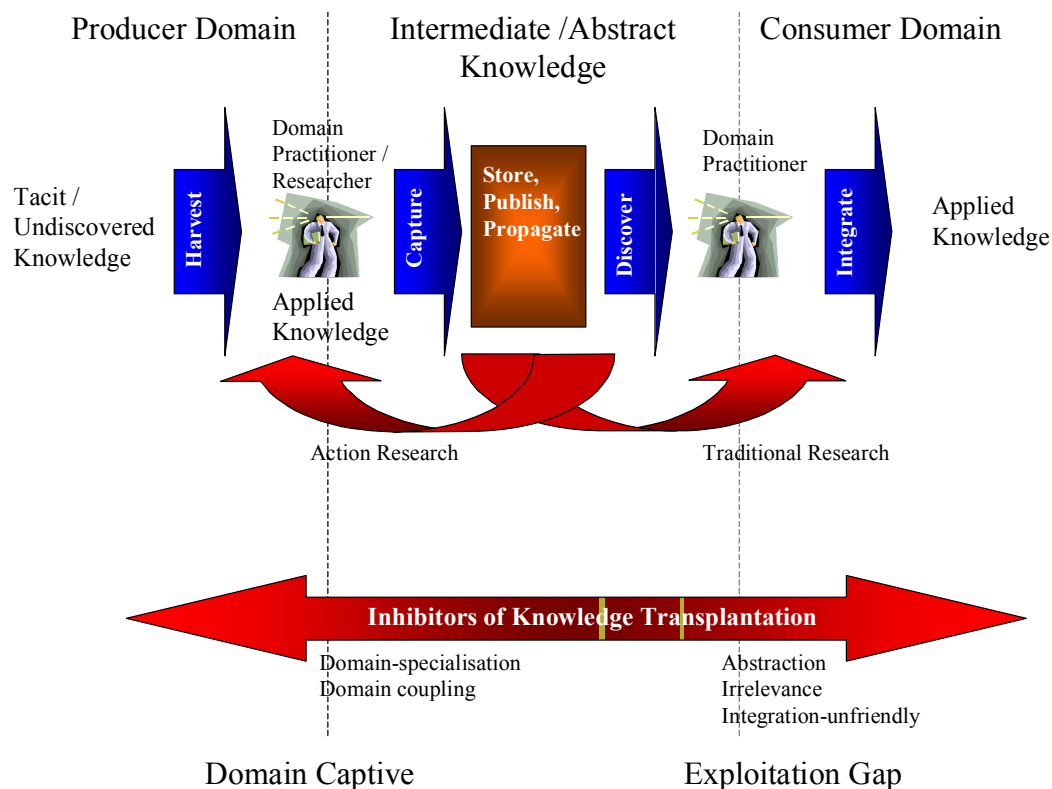
fail to benefit from a tremendous idea because they cannot integrate them into their practice.

If it is the case that there are 'natural' tradeoffs, then we should find a way to position Action Research alongside traditional research as part of an inclusive research environment in which the methods are well integrated. I'm the first to admit that I have very limited visibility of the broader environment & for all I know this integration has been achieved many moons ago. That said, I think that the highly personal nature of the knowledge that is harvested through the Action Research process makes it valuable for the individual doing the harvesting, but hard for that knowledge to escape from that domain.

It is quite possible that this process is something that the Monday group can see in action on a micro-scale, in the way that Alon is practicing a sort of 'extreme Action Research' where the domain is Alon himself and his own direct experience and not that 'inherited' from others. The frustration that has been evident in the group arises from the inhibitors to knowledge transfer due to domain-specific characteristics & lack of abstraction, making the ideas hard to communicate and for others to integrate into their own experience. This approach ensures relevance for Alon but reduces relevance for others and inhibits the transfer between domains (Alon and rest-of-world). It could be that what we are seeing here is a microcosm of the inhibitors that Action Research as a method encounters on a larger scale. Something it would be worth discussing is whether or not the nature of Action Research means that it works best on a small (individual) scale, and that traditional research is optimised to work on a large scale. My belief is that there is a symbiotic relationship between them, and all intermediate points on the research continuum- but that this often is not apparent.

Alignment and balance are important issues. If exploration in a small domain (e.g. personal experience only) is proposed to be applicable to a broad domain, the chances of it being so are very small. If exploration in a broad domain is proposed to be applicable to a broad domain, it may be so, but the gap due to the necessary abstraction prevents exploitation. In both extreme cases, value of the research is compromised for different reasons. Take three scenarios, traditional academic research, balanced knowledge generation and extreme personal research. Traditional academic research has the capacity to take in information from a vast domain, makes it portable but hard to integrate, extreme personal research takes a small domain (individual) and tries to extrapolate it to a wider domain, struggling to do so, balanced knowledge generation aligns the breadth of source and target domains so that the level of abstraction, decoupling etc of knowledge harvesting and application are kept in harmony.

This diagram below is a pretty non-rigorous attempt to articulate some related concepts. It highlights that practitioners and researchers are involved in harvesting and exploiting the knowledge and tries to position Action Research alongside and overlapping with traditional academic research.



### General Thoughts

It would be great to pursue in some depth the issues around enabling knowledge to cross domain boundaries as well as the properties of it and the environment that enable and constrain integration into a new environment. It is these factors that ultimately determine the value of the knowledge itself.

Individual reflection is an enabler of the harvesting and integration process at an individual level. It aids integration by reducing the 'distance' between the harvesting and its application domain—proximity has got to be a key enabler of integration. One process taking place here may be that the objectives and constraints of the applying the knowledge are borne in mind during harvesting, and have an effect on the exploration & discovery and limit the level of abstraction to that necessary for an individual to re-integrate at some time in the future (may be hours or years). This individual knowledge can then be enriched with knowledge from other sources, integrated, tested and embedded with practice.

The level of abstraction in traditional academic research could partly be a result of trying to cover a very broad domain. When faced with a vast amount of information, the best way to exploit limited resources (i.e. the mind of the researcher) is to abstract. But with abstraction comes loss of information and meaning, as the semantics and significance are lost as the context becomes invisible. Conversely the placing of the abstract knowledge into a new context creates meaning, significance and value.

If the objective is to maximise the value of knowledge, the ultimate application of that knowledge must be borne in mind during harvesting- not as an afterthought. There are 'structural' properties of the knowledge that inhibit or enable portability and integration that can not be fixed after harvesting- they can only be honed in context, when the meaning is available - no amount of refinement can compensate for structural properties. Failure to do this will result in lack of adoption or loss of integrity in the new domain.

From the perspective of *relevance* the advantage that Action Research has over traditional research is that the producer is the same person as the consumer, this means that the beneficiary and person paying the 'cost' of research are one and the same. This ensures that effort is not wasted on research that is not of use to the consumer. Maybe one problem of traditional academic research is not one that arises from the overall model, but because there are intermediaries involved who do not have enough visibility of the consumer domain to optimise the task. Also, it could well be that research is 'pushed' by the research agent rather than 'pulled' by the consumer domain with a resulting loss of relevance.