Systemic and Integrated Problem Solving
Evaluation of an NHS innovation workshop

Patrick Onions
Centre for Project Management, Leeds Metropolitan University, Leeds, UK
patrick@patrickonions.net

Samantha Morgan-Lister
The Sheffield GP Collaborative, Northern General Hospital, Sheffield, UK

November 2009

Abstract
Organisations are faced by increasingly complex and demanding challenges, and professional managers cannot afford to rely on serendipity or gut feel to produce solutions. Innovation methods focus on the exploitation of new ideas, but not on their generation. Problem solving methods such as brainstorming tend to focus on idea generation, but rely on individual creativity at the expense of methodical derivation. Systemic problem solving methodologies potentially offer a solution, yet these are scarce and are seldom employed in organisations. This paper reports on the first trial of the Systemic and Integrated Problem Solving methodology (SIPS) at one NHS service in Sheffield, and concludes that, despite being set an ambitious challenge, most objectives were met and only minor changes to SIPS and its application are needed.

Keywords
SIPS, problem solving, innovation, NHS, methodology evaluation

1. Introduction
Organisations are faced by increasingly complex and demanding challenges, and professional managers cannot afford to rely on serendipity or gut feel to produce solutions. One answer that has been proposed is innovation, which has been defined as the exploitation of new ideas (Sayer and Walker, 1992). Innovation is a powerful driver of growth, but it is not the whole solution. Organisations also need to be creative or inventive (Wilson and Stokes, 2005), and be systemic in seeing the challenge and solution as part of a larger system.

Creativity and problem solving employ a range of cognitive processes. Some people have a natural ability, but this proficiency can be affected by distractions, stress, pressure and problem complexity. Theory suggests that the necessary cognitive skills can be simulated sufficiently to allow individuals and teams to routinely invent solutions to specific problems. A set of three practical processes have been derived from this theory in an attempt to deliver creativity to innovation and straddle the gap between general strategy and problem solving. Collectively termed Systemic and Integrated Problem Solving (SIPS), these are intended to be analytical, supportive of rational (evidence based) decision making, situational and easy to apply.

SIPS is currently in development by the first author, so an offer to trial the processes in a live environment presented an ideal opportunity to critically evaluate the processes and understand more about their application. James and Roffe (2000) see evaluation as a judgement process that professionals undertake all the time with the intention of determining the efficiency and effectiveness of a course of action. They also suggest the reasons for conducting an evaluation are as a means of improving the technique, a means of retaining focus, for professional thoroughness and to report on results. This paper will report on that trial to record findings, document recommendations to improve SIPS process, and to adhere to employer's research practices.

2. Research methodology
A review of innovation and change management literature reveals a broad and inconsistent range of criteria have been proposed for the evaluation of innovation. Much of this literature has an organisation and implementation focus, whereas this research intends to improve the SIPS processes. A hybrid research methodology will be used to combine tried-and-tested approaches with the unique needs of this evaluation and its subject area.

This investigation had strong practical objectives, a focus on improving the processes and the situation they were applied to, and was iterative in nature. Action research (McNiff and Whitehead, 2006) was chosen to guide the programme. The workshop reported on by this paper was the first live trial of SIPS. Previously SIPS had only been tested in individual settings through desk applications. The

investigation sought to evaluate performance of the processes as well as inform researchers about its deployment in workshop settings with larger groups. Since the trial environment and context were complex, mixed methods were chosen to collect and analyse workshop data.

A participant questionnaire was used to gather information about the problem, innovation, creativity, process efficiency and process effectiveness. Choice of criteria was informed by a review of innovation and change management evaluation literature. Participants were asked twelve questions with three and five-option Lickert scales, six questions requesting quantitative answers, and four open field questions requesting comments and general information. Reflective analysis was then used to examine the workshop itself, combining a process approach to critical analysis with Brookfield's four key critical reflection actions of assumption analysis, contextual awareness, imaginative speculation and reflective scepticism (1988).

3. The workshop
The NHS Northern General Hospitals' Out of Hours GP Practice and Walk in Centre services in Sheffield agreed to holding an innovation workshop to trial the SIPS processes. The workshop was to assist with internal restructuring and efficiency improvement initiatives.

The workshop topic was chosen by the Service's General Manager, this paper's second author, and aimed to critically examine team and management structures, discover improvement ideas, build awareness of change, and ensure that management hadn't missed potential contributions from key employees.

The first author prepared material and facilitated the workshop.

Participants consisted of the facilitator and ten participants from the organisation. Participants included the General Manager, Director, Operations Managers and key operational personnel from the Service.

A four hour afternoon workshop commenced with setting the objectives and introducing the SIPS process and the conceptual analysis process (or hourglass model). One and a half hours were spent on the first step of the conceptual analysis process; identifying specific problems. A total of 81 organisation issues and personal frustrations were identified as drivers of the need to change.

Half an hour was then spent on the second step of the conceptual analysis process: discovering general problems. Organisation issues were consolidated into a set of six key common problems and two major constraints. Two of the general problems were selected for further investigation; communication and structure. Elements of the creative SIPS process were employed, followed more rigorously for the communications issue than for the structure issue due to time constraints. One hour was spent on each of the problems. Participants were finally asked to complete the research questionnaire on conclusion of the workshop.

4. Questionnaire findings
The workshop was set an ambitious objective. Finding a solution was rated as very important by 25% of participants and vital by 75%. Participants felt that the problem and solution had or would affect a statistical mean of 93% of the organisation. Perrin (2002) noted that evaluation should reward ambition and not encourage 'safe' thinking, and Peltokorpi et al. (2008) saw the complexity of the challenge as a critical factor in evaluation.

Participants were not generally aware of alternative solutions to the challenge that were considered prior to the workshop, with only two participants indicating a specific number. There was also uncertainty as to the number of ideas generated during the course of the workshop, despite the flip-chart pages being prominently displayed. Responses do however strongly support the general conclusion that the workshop generated new ideas and that a number of these were overtly useful or worthy of further consideration.

SIPS did encourage personal and group creativity for 75% of participants, and led to problems being solved for 88%. The quality of ideas produced was good (25%) and worth evaluating (75%). The SIPS processes were seen to be generally effective, as charted in *Figure 1* below. This is encouraging, given that innovation is risky and can produce uncertain outcomes (James and Roffe, 2000).

Marigliano (2009) saw perceptions and expectations as important to innovation evaluation. Peltokorpi et al. (2008) saw motivation to participate as critical to success. On the other hand, James (2009) implies that the satisfaction of participants or stakeholders in the process should not be equated with success of the process. Given the importance of the problem and solution in this case, it was felt that expectations would be high and that failure of the workshop to engage with these would be detrimental. The workshop met the varied expectations of 63% of participants, with 25% feeling it met some expectations, 13% being unsure, and none saying it did not meet expectations.

All participants found the processes easy to grasp, and 88% found the processes easy to use. This allowed participants to focus on the problem, and supported the facilitator whose is seen by Roffe (1999) as having an impact on outcomes.
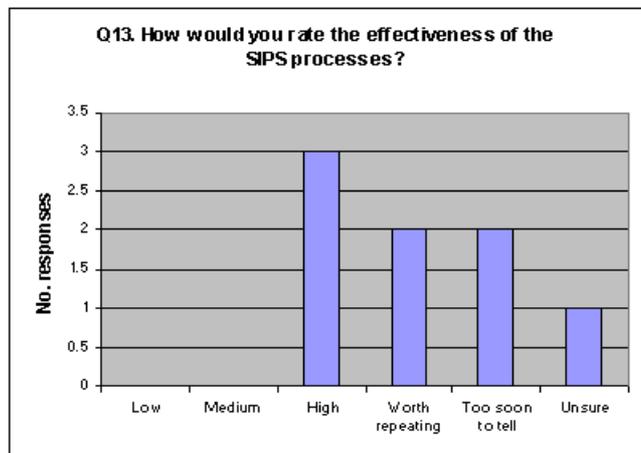

Figure 1

In terms of SIPS performance, there was no consensus as to whether the processes were quick to produce results. Marigliano (2009) found innovation has not enjoyed widespread popularity as, amongst other reasons, it is not a systemic, repeatable process. Most participants (88%) felt the SIPS processes were methodical and that the processes could or maybe could produce results in a reliable fashion. Many saw the processes as better (63%) or maybe better (113%) for groups than for individual use. SIPS did remain focused on the objectives for 88%, and remain focused on the problem for 100%. As an inventive methodology, SIPS generated just the right amount of ideas for 63% and more ideas than needed for 25%.

Marigliano (2009) felt that innovation techniques should be evaluated against alternative approaches. A variety of innovation methods previously used by participants, and these were found to be average for 63% and good for 38% in their effectiveness. Prior use of brainstorming, mind maps, process mapping, benefits dependency network, modelling and project management as problem solving methods was noted. *Figure 2* shows SIPS performed well against alternative methods for most participants.

Open questions asked of participants showed that breaking problems down and the systemic approach was seen as contributor to SIPS effectiveness. A need to put or see ideas in action was seen as an area to improve. Facilitation also warrants consideration, with one comment noting that "*it would work well with practiced facilitator*".

Participants were not collectively prepared for the workshop, with expectations ranging from the specific

"*brain storm, problem solve, action plan*" to the uncertainty of "*I wasn't sure what to expect*". More preparation for the workshop appears justified, a perception consistent with Perrin (2002) who was of the opinion that detailed planning and control of innovation initiatives is essential.

General comments yielded improvement areas for the processes and for workshop design and facilitation. It was recognised that the workshop allowed all to participate, and focused on organisation (service) wide issues. The workshop therefore appeared to be successful in making innovation the responsibility of most people in the organisation, seen as important by Bessant (2003, p.185).

Another participant called for more discussion around the "*neck of the hourglass*", referring to analysis of general problems and general solutions. Accordingly it is acknowledged that the major challenge, restructuring, received inadequate attention for a number of reasons that should be explored through reflection. Had more focus been placed on the steps around the neck of the hourglass, there would have been even less time to devote to inventing specific solutions to the two chosen challenges.
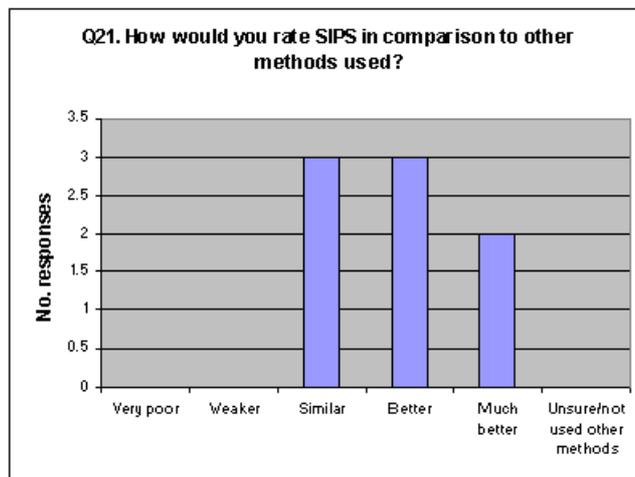

Figure 2

One participant felt a whole day workshop was needed, and that small breakaway groups would have allowed quiet participants to interact more. Another comment mirrored concerns prior to the workshop that the challenge was too broad; (it) "*needs to focus more on a specific issue area and work through to completion*". This however would be difficult in the context of a workshop and difficult given that innovation is a long-term endeavour (Perrin, 2002). In proposing a stakeholder approach to evaluating organisation change initiatives in a hospital environment, a paper presented by Peltokorpi *et al.* (2008) also provides a number of relevant suggestions for the evaluation of the workshop outcomes. Expected benefits should be evaluated against the challenges to

implement, particularly resistance to change, dispersed and opposing goals, the complexity of the challenge and managers' capability. Effects on stakeholder actions and positions, capability to influence implementation, goal clarity, motivation to participate and capability to change are also provided as factors. These are all long term actions with an implementation focus.

5. Critical reflection

Reflection on the workshop was methodically undertaken so as to produce valid objective findings. A sceptical perspective was adopted in contemplating the underlying assumptions, the context of the workshop, the workshop itself, and speculating on alternative outcomes.

Management and innovation are social constructs, phenomena that are created by people and products of the interaction of people within a particular context. Study of these subjects should therefore recognise the impact that perspectives and approaches of participants, stakeholders and observers have on the outcomes. The following positions have influenced the design, implementation and research of SIPS:

- A desire for a systemic approach, seeing the subject and the process as part of a larger system of organisation strategy and organisation change.
- An inclination towards simple elegant solutions, ensuring concepts are easier to communicate, implement and manage.
- A preference for rational or evidence-based decision-making.
- A customer and outcomes based focus, with demonstrable benefits and results-based performance measurement.

The stance reflected by these positions appears to be incongruous with what one participant referred to as the "*NHS mentality*", little sense of urgency, bureaucracy and a tendency towards insular thinking. A combination of process and facilitation drove broader exploration of issues than was possibly comfortable for participants.

The conceptual analysis process appears adept at encouraging systemic thinking, generating a broad range of issues and narrowing them into solution areas. Reflection shows that the broader objectives of building awareness and gathering potential contributions had been achieved.

A comment by one participant that the SIPS "*needs to focus more on specific issue area*" and reflection shows that more specific objectives (to examine team and management structures and discover improvement ideas) were not sufficiently achieved. Studying the

proceedings reveals that the conceptual analysis process identified more general problems than the workshop could feasibly consider at the level of detail entailed by the creative process. The facilitator should have chosen to explore the one issue of '*structure*', rather than begin with the less important issue of '*communication*'. The transition from systemic thinking to creative thinking appears difficult in this context, and requires clear preparation and control on the part of the facilitator. Careful selection of the workshop challenge is also important, followed by conceptual planning between the facilitator and sponsor to ensure the most productive paths are followed. Workshop techniques such as separately identifying issues that can actively worked on from issues that the organisation can only mitigate against should also be accentuated and used to focus on the specific objectives.

In practice the boundary between general problem and general solution were blurred, with little attention being paid to identifying high level solutions. More investigation needs to take place to determine whether this was a missed opportunity or whether deriving general solutions at this point is a useful and feasible exercise.

Generation of specific solutions was undertaken using elements of the creative process, and not as a distinct and separate step in the conceptual analysis process. If evaluation and selection of solutions is not undertaken during conceptual analysis, then merging the two processes at the point of general solutions should be investigated.

Idea generation worked better for '*communication*' than for '*structure*'. Several explanations are apparent. Time constraints, lack of facilitation experience and a complex set of problems lead to poor utilisation of the entire creative process. More attention was paid to the first three steps of the creative process for the first issue than to the second. The examination of '*structure*' almost totally abandoned the creative process, and the facilitator was not able to suggest alternatives to the participants as he was not familiar with the organisation. Following the creative process would have built up that familiarity, but more importantly would have required the participants to disassemble their structure and reconstruct it in a variety of ways that were not bound by convention.

This failing also suggests investigation into the order of creative process steps is needed. The first step should model the 'as-is' scenario, followed by its deconstruction and then application of transforming actions. This will provide the facilitator with the contextual understanding needed to prompt unwilling, risk-averse, uninspired or entrenched participants. It

will also identify the elements that are needed for deconstruction, transformation and reconstruction.

Application of transforming actions on the fly is a difficult exercise for the facilitator and for the participants. In their current form, transformation 'rules' requires considerable imagination and lateral thinking. These should be generalised, and part of the workshop preparation should entail developing relevant illustrative examples for each rule.

The workshop did not engage with the final two steps of the creative process. Inspection of the outputs suggests that some preliminary selection of options produced would greatly benefit the transition from workshop to implementation; even if the sponsor only intends to use the workshop outputs to inform further contemplation. Chosen options could be simplified and consolidated to present more polished solutions. Producing action points and assigning responsibilities was possible with the '*communication*' problem area, but not possible with the examination of '*structure*'. Participants noted this oversight on the second issue, with one participant noting that ideas "*need to put into action for a better result*". This is a valuable addition to the process, improving the clarity of outcomes and ensuring implementation of the workshop's outputs.

6. Conclusions

This evaluation recognises that using an untried concept on such an important and broad challenge was too ambitious. Evaluation of this breadth of processes was complicated and could not be entirely separated from the subject on which they are employed. Partial success in achieving the objectives should therefore not be regarded as a failure of the SIPS processes.

The SIPS processes appear to be effective, and to have helped achieve many of the trial workshop objectives. They were rated as more effective than other problem solving and innovation techniques used by the participants, and appear to be palatable to the participants.

Problems were encountered, and these indicate minor changes to the processes and a better design of the implementation mechanisms are warranted. The importance of planning and preparation cannot be underestimated, particularly in problem selection. The workshop was also heavily dependant on facilitator skill and creativity. More adherence to the SIPS processes during the workshop and more detailed instructions for facilitators at each step would transfer the problem solving burden to participants and make the processes themselves more effective.

8. Bibliography

Barbiroli, G. and Raggi, A. (2003) "A method for evaluating the overall technical and economic performance of environmental innovations in production cycles", *Journal of Cleaner Production*, Vol. 11, pp. 365-374

Bessant, J. and Tidd, J. (2007) *Innovation and Entrepreneurship,* John Wiley and Sons, England

Brookfield, S. (ed.) (1988) *Developing Critically Reflective Practitioners: A Rationale for Training Educators of Adults. Training Educators of Adults*, Routledge, New York

Bryman, A. and Bell, E. (2003) *Business Research Methods,* Oxford University Press, New York

de Jesus-Hitzschky, K.R.E. (2007) "Impact Assessment System For Technological Innovation: Inova-Tec System", *Journal of Technology Management & Innovation*, Vol. 2, Issue 2, pp. 67-82

de Jesus-Hitzschky, K.R.E., Carraro, A.P. and Júnior, L.S. (2008) "Assessment of Impacts of the Forest Incentive Program based on Eucalyptus Monoculture with the 'INOVA-Tec System", *Journal of Technology Management & Innovation*, Vol. 3, Issue 4, pp. 119-132

Isaksen, S. and Tidd, J. (2006) *Meeting the Innovation Challenge*, John Wiley and Sons, England

James, C. and Roffe, I. (2000) "The evaluation of goal and goal-free training innovation", *Journal of European Industrial Training*, Vol. 24 No.1, pp.12-20

James, R. (2007). "Evaluating teaching innovation", *Melbourne Graduate School of Education Centre for the Study of Higher Education*, Short notes, available online at http://www.cshe.unimelb.edu.au/resources/cshe_res.html

Marigliano, J.V. (2009) "Structured Innovation: A Proven Method for Improving New Product Success", *Six Sigma and Process Excellence IQ*, 06 July, available online at http://www.sixsigmaiq.com/article.cfm?externalid=947#

McNiff, J. and Whitehead, J. (2006), *All you Need to Know About Action Research*, Sage, London

Miles, I., Cunningham, P., Cox, D., Malik, K. (2006) "Smart Innovation: A practical guide to evaluating innovation programmes", *European Commission DG Enterprise and Industry*, available online at ftp://ftp.cordis.lu/pub/innovation-policy/studies/sar1_smartinnovation_master2.pdf

Onions, P.E.W. (2009), "Thinking Critically: Academic writing with an open mind", working paper, available online at http://www.patrickonions.org/docs/academic/2009%20Thinking%20critically.pdf

Peltokorpi, A., Alho, A. Kujala, J., Aitamurto, J. and Parvinen, P. (2008) "Stakeholder approach for evaluating organizational change projects", *International Journal of Health Care Quality Assurance*, Vol. 21 No. 5, pp. 418-434

Perrin, B. (2002) "How to – and how not to – evaluate innovation", *Evaluation*, Vol. 8, No. 1, pp. 13-28

Saunders, M., Lewis, P. and Thornhill, A. (2006) *Research Methods for Business Students*, 4th edition, Financial Times/ Prentice Hall, England

Sayer, A. and Walker, R. (1992) *The New Social Economy: Reworking the Division of Labour*, Blackwell, Cambridge

Tidd, J., Bessant, J. and Pavitt, K. (2005) *Managing Innovation*, 3rd edition, John Wiley and Sons, England

Wilson, N. and Stokes, D. (2005) *Managing creativity and innovation: the challenge for cultural entrepreneurs*, Journal of Small Business and Enterprise Development, Vol. 12 No. 3, pp. 366-378