Levels of Abstraction

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Managing Innovation

Levels of Abstraction

This is a simple but powerful tool for finding new insights and perspectives on a problem issue. It involves finding analogous situations and transferring ideas which work in that context back to the original problem.

Step 1 is to analyze the current problem in terms of its root cause. Let's take the example of patient safety in a hospital ward (a theme explored in detail during the DOME (Designing out Medical Error) project.

Problems with patient safety were analyzed using a combination of problem finding and analysis tools such as fishbone (cause and effect diagrams), frequency charts and observation. The results suggested that many problems were due to communication problems at changeover points – for example when the night shift came on to the ward the day nurses sometimes failed to pass on key information.

Step 2 is to climb away from the specific situation and define the problem in generic terms. In this case it would be 'communication problems at handover'. This is moving the problem out of its context and to a higher level of abstraction.

Step 3 is to search for other examples from other contexts where 'communication problems at handover' are an issue. For example they occur when there is a shift change in any kind of manufacturing or service operation where people work a 24 hour day, they happen when a new team replaces an existing one (for example in the military or on oil rigs and other remote facilities), and they can be found when staff are moved between different regions of a business.

Step 4 is to descend down into those particular situations and explore how they handle the communication issue in that context. What approaches do they use, how do they avoid failure, how do they manage the process? For example they may have developed checklists or induction/handover procedures which might provide clues about how to deal with the challenge in your own situation.

Step 5 is to go back up the ladder again, looking at the possible solution in terms of its generic features and principles.

Step 6 is to come back down to the original problem with new ideas which can be adapted and configured form the generic principles to something specific which can be tried in the original context.

Some examples of such 'recombinant innovation' where insights from one world are successfully adapted and used in another include:

- Low cost airlines learning about rapid changeover/turnaround of aircraft. They learned these ideas form manufacturing where set-up and changeover times on heavy machinery

can be cut down using simple tools and procedures. Other insights came from watching Formula1 pit stop teams where the time taken to turn a racing car around I s measured in seconds. And these insights from the race track have been successfully adapted and applied in managing operating theatre turnarounds in key London hospitals.

- The Aravind eye clinics have revolutionized eye care in India bringing safe and low cost treatment to the poor. The ideas behind doing so consistently were drawn from watching how McDonalds run their fast food operations – and they in turn made use of insights and approaches which originally came from Henry Ford's mass production car factories.

- Queuing in major events or at facilities like airports have learned valuable lessons from managing the flow of crowds at Disneyworld and other theme parks.