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Practice Summary: Decision Conferencing Rationalises Defence Training

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In October 2010, the UK Secretary of State for Defence announced a process to transform defence to meet the challenges of the future. This process set out a series of complex decisions, including the future location for defence technical training. Five months after the announcement, the Defence Technical Training Change Programme (DTTCP) team contacted Catalyze to request support for the DTTCP decision-making process. The team recognised that this would be an important and highly sensitive process, and would need to deliver efficiencies while improving the overall value delivered by defence technical training. Catalyze used decision conferencing and multicriteria decision analysis to help the DTTCP team and stakeholders understand the challenges and reach agreement on a solution. In July 2011, the Secretary of State for Defence announced the recommended location and the migration plan for the three branches of military service to consolidate specific technical training services into a single site.

Key words: decision; decision support; decision theory: multiple criteria; decision: applications, defence.

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Five months after the announcement, the Defence Technical Training Change Programme (DTTCP) team contacted Catalyze requesting support for the DTTCP decision-making process. The team recognised that this would be an important and highly sensitive process, which would need to deliver efficiencies while improving the overall value to defence.

In helping organisations to address decision-making complexity, Catalyze has learned it is important that the leaders explicitly understand and agree on the following four topics:

— organisational context (problem set);
— value perspectives of all stakeholder groups;
— objectives, costs, and assumptions; and
— key trade-offs.

The number of potentially viable options to be assessed proved to be challenging for the DTTCP team. Defence technical training spans three branches of engineering—aeronautical, electro-mechanical, and communications and information systems—in each service branch (i.e., Navy, Army, Air Force). In addition, six sites in the United Kingdom had the capability to deliver all or part of the technical training. As a result, the DTTCP team needed to consider more than 20 options, including all feasible combinations of training schools, branches, and physical locations.

The requirement to consider a complete set of criteria from a diverse group of stakeholders was an additional challenge. These criteria covered data-driven factors relating to the training infrastructure, condition of the facilities, and more qualitative aspects (e.g., sustainability, town planning). Our initial challenge was to identify which aspects of the masses of data were relevant to the decision-making process and where we could use expert opinions to inform value judgments.

Making data and value judgments was relatively straightforward compared to the hardest challenge—reaching agreements across the diverse requirements of the DTCCP stakeholders. Making the right technical training site decision was only the first step of the

rationalisation program. Understandably, we anticipated great resistance to change. Therefore, to ensure that this decision would not be challenged, and possibly changed, at a later date, we needed to build sufficient ownership and trust in the decision process to create a defensible rationale for the recommendation.

Given these complexities, providing process and real-time analyses that would engage the stakeholders was key; we wanted them to reach a shared understanding of both the problem and the solution. In reality, this social process was far more important than the numerical results of an analytical model. An option-appraisal project, which we would form around the operations research (OR) technique of decision conferencing (Phillips 2006), was an obvious and effective means of meeting the criticalities of the DTCCP team's needs.

A decision conference is more than a workshop or meeting. It combines the technical elements of decision analysis with group facilitation, and has the specific objective of building a requisite multicriteria decision analysis (MCDA) model (Phillips 1982, 1984). Phillips defines a requisite model as one whose form and content are just sufficient to solve the problem (Phillips 1982, 1984).

Collectively creating an MCDA model enabled the stakeholders to construct a new, common perception of the problem and to provide a clear framework and environment to support a structured and objective debate about the advantages and disadvantages of the technical training locations. We constructed the MCDA model using Hiview3 software (Figueira et al. 2005). Using Hiview3 generally involves four steps:

1. Constructing a value tree that represents the criteria against which the decision options will be measured; examples are costs, including infrastructure and people, and benefits, including financial and service measures.

2. Appraising each decision option against the criteria.

3. Setting preferences for the relative importance of each criterion.

4. Analysing the decision options with respect to their overall value across the criteria, including identifying dominant options and testing the model's sensitivity and robustness.

The process used data and judgments of UK Ministry of Defence experts from each of the three armed services branches and the Defence Infrastructure Organisation. From February to May 2011, we collaborated with the DTTCP team to design and facilitate seven multilevel stakeholder decision conferences. We linked the assessment of the fundamental elements of the MCDA model (i.e., scores and swing weights) to the roles, expertise, and strategic perspective of each decision conference participant. Clear input accountability helped to create a feeling of ownership of the model, which evolved during the course of modelling.

Three key stakeholder groups, each with an exclusive modelling task, participated in the workshops.

1. Experts (i.e., technical trainers, site representatives) have expert technical knowledge and were accountable for scoring the options.

2. Strategists (generally high-level management) have the defence strategic view and were accountable for determining the swing weights of the model.

3. Observers were present to ensure that the facts and data gathered (e.g., infrastructure surveys) were handled and understood correctly or to provide independent assessments of the process implementation.

The decision analysis approach, in particular the series of multiple-stakeholder decision conferences, helped manage the social and technical complexities of this rationalisation program. The approach brought transparency to the process and helped create a common purpose among the participants. Catalyze's independent facilitation also enabled the DTTCP team to run the site-option-evaluation process without being influenced by unrealistic expectations or unspecified or incorrect assumptions.

A requisite MCDA model (Phillips 1982, 1984), including 28 criteria and 24 options, was developed in conjunction with the stakeholders. Catalyze created the initial model structure based on existing documentation. During the first of two workshops held in March 2011, each option was scored by the team of subject matter experts with particular knowledge of that option area. This permitted a wide-ranging discussion on the benefits and constraints of each option. In the period between the two workshops, attendees involved in the initial scoring process briefed

their respective communities on the scoring and subsequent discussions; these briefings enabled those present at the second workshop to weight the model.

We used the process of swing weighting (Clemen and Reilly 2001, Goodwin and Wright 2003) to combine the criteria scales. For each criterion, participants were asked to determine the difference between their least- and most-preferred options, and to assess how much they cared about the differences across the criteria. Once the weights are established in the swing-weighting process, they show how much an increase in one criterion is equivalent to an increase in another, similar to how an increase of nine Fahrenheit degrees is equal to an increase of five Celsius degrees.

In our example, one criterion in the model describes the requirement for a command task area (CTA) and also includes a list of important characteristics, such as the number of task areas and the storage space available. A second criterion covers the auditorium requirements, including the ability to seat a large number of people and support a range of events. One might instinctively think that the CTA is more important than the auditorium in providing technical training. However, when the swings of the criteria from the lowest-performing option to the highest-performing option were considered, the weighting assigned to the CTA was approximately one-fourth of the weighting assigned to the auditorium. All options clearly met the CTA requirement relatively well when compared to the auditorium requirement.

The process starts at the bottom of the value tree, weighting each node independently, and works up to the root node. As the process moves up the tree, the criteria from the node with the greatest swings are compared with each other, and the resulting weights are used to scale the weights further down the tree. The software automatically scales weights to ensure that the relative importance of all assessments and judgments are maintained.

Following these workshops, Catalyze conducted sensitivity analyses on the model in real-time with the stakeholders. The analysis considered the different perspectives of the diverse stakeholders; four scenarios, each based on a different assumption, were reviewed. The Hiview3 sensitivity analysis tools (i.e., sensitivity up and down) were used to illustrate that (1) the model is robust, and (2) only significant changes could alter the order of preference of the options.

The completed MCDA model did not make the final decision; it informed the decision and guided further action by the DTTCP team. Two months after the conclusion of the process, the business case was signed off, and the Secretary of State for Defence announced the recommended location and the migration plan for the three services to consolidate specific technical training services into a single site.

Catalyze has subsequently been involved in additional decision support work to maximise the value of technical training to defence through the migration programme.

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Bob Kitchen is one of the founding directors of Catalyze. He has more than 30 years of experience in the consulting business holding a number of senior management positions including business consulting, innovation, strategy, and new market development. Before starting Catalyze in 2001, Bob was a partner and director in Hewlett-Packard's European consulting business. Bob uses his experience and skills to help clients in realizing the potential of their organizations. He holds a degree in engineering, is a member of the IET, and an active member of the International Decision Conference Forum (IDCF).

Carmen Carmona joined Catalyze in 2011 after completing her master's degree in decision sciences from the London School of Economics. She worked as a consultant and analyst on a wide range of client projects in the United States, United Kingdom, and New Zealand. In 2011, she won a Robin Cosgrove Prize for her work on the application of decision theory to ethics in the context of financial investments. Currently, she works in her home country of Mexico helping to design and implement evaluation systems for energy efficient programs across different sectors.

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