

Decision Trees.

Decision trees are an effective way of organising reasoning and analysing the problem. A clear identification of a sequence of events and the links between them makes problematic decisions much easier to understand and manage. By making estimates of the probability [likelihood] and desirability of consequences explicit in numbers, it is possible to work out which option has the highest value and show the grounds for the final choice.

Framework for Decision Trees

1. What decision is to be made?
2. What options are there?
3. What information is needed to help make the choice?
4. What are the likely /possible consequences of each option?
5. How probable is each consequence?
6. What are the pros and cons of each consequence? [desirability]
7. The final decisions?

The strength of the decision tree is that it makes you think widely. This can also be a disadvantage in that it can generate too much information. Judgment is needed to decide how much effort to put into the decision and therefore how much information to generate. Experience can help to reduce the detail to which the framework needs to be applied. One writer [Hammond] suggests applying one's energies to the stages of the decision framework that are most problematic. Quite often when one scans through the whole process it is possible to identify which points can be decided on easily and which ones are the most crucial or difficult for that particular decision.

It is important not to exaggerate the objectivity of decision theory. Although it uses mathematics the practitioner has to use their own judgement in giving utility values to the outcomes and assessing their probability. But using the tree does help to push the decision along the analytic intuitive continuum towards becoming more analytic. It helps break a complicated decision down into smaller and simpler parts. It assists, but does not replace the human decision maker

The decision framework need not be followed in detail in every situation. Professionals can use it to sketch an overview of the decision they are facing and then concentrate on the problematical elements. It encourages people to make their intuitive reasoning explicit and then think it through more thoroughly. It does not remove subjectivity from the process and two rational people will not necessarily reach the same conclusions. It does however help to identify where and why they would disagree and provides a clear and defensible account of how a decision was reached.

Instructions for completing decision tree

- Step 1** What is the decision to be made? Enter data into square on left of tree.
- Step 2** What are the possible choices [options]? Enter up to four different options. Write these along the radiating lines coming out of the square.
- Step 3** What are the possible consequences of the different options? Create the same number of consequences for each option [3 or 4] and write along the lines radiating from the circles.
- Step 4** Try and give a score to the probability [likelihood] of each consequence occurring. Score somewhere between 0% and 100% [0=certainly not and 100=certainly will]. The total score across the consequences for one option should equal 100%. You will be likely to use research evidence, practice experience and discussion and debate to help you decide on this. Place the score in the triangle.
- Step 5** Try and decide on the desirability of each consequence occurring. Ascribe a score between 0-10. [0=least desirable, 10=totally desirable] These do not need to total up to 10. You have to use your judgement to decide on the desirability by weighing up the impact on the child, their family –wider society, cost to agency etc. etc. Place this score in the last box on the right.
- Step 6** Multiply each probability score by each desirability score, then add these together for each option. This gives you a total score for each option. Place this score in the square inside the tree. The option with the highest overall score is the best option for you to choose as it combines realistic likelihood of success with best desirability.

An example

Scenario: I am walking to the train station in the morning on my way to run a training session. I am almost at the station when I realize I have left some cards for an exercise at home on the floor of my study.

Decision: What course of action is most likely to get me to the course on time with all the training material?

What are my options?

1. Turn around to go home and get them
2. Carry on to the station and improvise something else for that part of the course
3. Phone my partner to bring them to the station

What information do I need to choose between the options?

1. Is my partner at home/awake/willing to help?

- Do I know for sure where the cards are?
- What time is the next train if I miss this one and when will I arrive at the training venue if I take that train?
- Can I think of something else to do with the group instead of that exercise that won't diminish the quality of the course?

Probability: 0 = impossible; 1 = certain

Utility Value: Desirability of outcome; 0 = very undesirable/10 = highly desirable

Multiply probability by utility value to get the score for each option

