Abstract
This paper describes the use of a specific Group Support System (GroupSystems) for Risk Identification and Analysis, sometimes called Control Risk Self Assessment (CRSA). The process can be applied to an entire organization, a department or a project. In this process, the key people involved enter the risks into networked laptop computers. The risks are discussed and the definitions refined. Participants then vote upon these risks by two criteria simultaneously, to assess both the likelihood of the risks and their potential impact. The display of the vote results shows the participants’ combined perception of the risks. The paper summarizes the historical development of risk management techniques – these techniques are already established in a conventional ‘flip chart’ style meeting - and shows the benefits of a GSS approach. It then outlines the GSS process, including techniques to ensure clear risk definition, categorization and possible different voting scales. The advantages of this approach are described, including the self-documentation capabilities. User experiences and lessons learned are described. This process shows a high degree of customer satisfaction and has been used in hundreds of workshops around the world. The process naturally extends to the use of distributed meetings in situations where it is not practical for all participants to meet face-to-face.

1. Introduction

Identifying and assessing risk is a basic management responsibility in all organizations. However good the plans are, it is essential in any significant activity to ask the question, “What might go wrong?”

This question is important not only in the practical issue of helping to ensure a successful venture. The question also relates to legal requirements upon company directors for health and safety, and for protecting shareholders assets.

In asking this question, “What might go wrong?” a number of issues must be addressed. The question must be put:
- to the right people
- at the right time
- in an environment that allows them to answer freely and openly.

There is limited value in asking people who don’t have the knowledge to give authoritative answers. To ask the question too early in a project, when many details are not yet clear, is likely to produce only vague answers. Neither does it make good business sense to ask the question too late in the project, when changes can be very expensive.

It is clearly also important to allow people to answer freely, without exposing themselves to reproach from colleagues who might prefer to leave certain stones unturned.

The challenge in this risk definition process is to be:
1. rigorous, in that all areas of risk must be covered.
2. participative, so that any action plans based on the risks are fully supported by the group themselves
3. consistently applied, so the results can be summarized across the organization.

The use of a GSS (in this case GroupSystems) can simultaneously satisfy these requirements.

An added benefit of the process described in this paper is that GroupSystems and similar software has wide applicability in most other business processes.

2. A Group Support System

A GSS is generally considered to be a computer system that improves how a group of people work together. In these ‘electronic meetings’, normal discussion is supplemented by enabling participants to enter facts, opinions, questions, votes and commitments onto a computer, participants usually having their own
computer. These computers are networked together so that input is shared. A trained facilitator assists in developing the agenda and leading the meeting.

The phrases ‘Group Support System’ and ‘Electronic Meeting’ are often used interchangeably and will be so in this paper.

For a general description of Electronic Meetings see Weatherall and Nunamaker [13]. Section 6 below gives a fuller discussion of the benefits in this context of this paper.

2.1 Face-to-face Electronic Meetings

Many thousands of face-to-face Electronic Meetings have been run over the last 15 years. Boeing and IBM reported savings of over 50% in elapsed time when compared with conventional meetings. This technology is now well established.

2.2 Distributed Electronic Meetings

Developments in networking technologies make it practical to run Electronic Meetings across organizational networks and across the Internet. Some ASP’s (Application Support Providers) now offer this as a service. Thus participants can take part in meetings from their office, a hotel or even their home.

The value of distributed meetings (as opposed to face-to-face meetings) is still being explored. In terms of intellectual content one might well posit that distributed meetings can be just as effective, with the saving of travel time and cost as a significant benefit. However, an interesting contribution to this debate was made in July 2001 by the Prime Minister of Great Britain, Tony Blair. Defending the need for international get-togethers of national leaders, in spite of the chaos and damage at the Genoa G8 summit, Blair said, “New technology brings many benefits but there is no substitute for personal chemistry. ….. Would we have agreed a route map for co-operation on Africa if we had not met face to face but communicated simply by e-mail? I very much doubt it” (London Sunday Times, 22/07/01).

Another apparent benefit of distributed meetings is that participants do not need to make their contributions at the same time. Meetings can be ‘different-time’ or ‘asynchronous’, whereby participants join at the meeting at whatever time is convenient to them. However, in these meetings it can be difficult to ensure that participants have considered all the input. The first participant to input opinions or suggestions will not know how the other participants react or what other ideas they may have, unless he or she rejoins the meeting at a later time. Hence participants may need to sign on to the meeting several times in order to have participated fully.

However, Distributed Meetings can certainly supplement and extend face-to-face meetings. Action reporting, for example, can be completed effectively, thus enabling people to keep up to date with progress without needing to meet face-to-face.

Many on-line and remote surveys involving employees, customers, suppliers and the wider community of stakeholders can be seen as forms of distributed meeting.

2.3 GroupSystems

GroupSystems, the software used in this paper, was developed at the University of Arizona in the 1980’s. Some three years ago there were over a thousand active GroupSystems licenses around the world.

More detail about this software is given in the Appendix. See also Nunamaker, Dennis, Valacich, Vogel and George [8].

3. What is Risk Management?

Risk Management in this context is the process of defining risks, sizing them and defining actions to deal with them.

Risk is traditionally considered to be a hazard; the risk of things going wrong. A risk is any factor or event that could impact the organization’s ability to meet its objectives, for example the risk of losing customers or the risk of not retaining quality staff. Not knowing if an event will turn out positive or negative is a risk.

Risks can be considered on many levels but must always be considered in the context of the question ‘...risk to what..?’. Risk needs a reference point to make the risk assessment process effective.

According to Dean [4], “risk has a most probable actuarial value and dispersion about it.” This distinguishes risk from uncertainty which, “in its pure form does not make it possible to know either the most probable value or the amount of dispersion about it”. However, this distinction is not universally accepted.

A risk needs to be worded with precision. One approach is to define a risk by completing a sentence beginning with, ‘The risk is that….’ This format helps ensure that the risk has a verb; it also should be in some way specific. For example, ‘…the company might lose money’ is not a good definition of a risk; ‘production capacity might not support a 10% increase in sales’ is much better. Many organizations preface the risk description with a negative term; failure to, insufficient,
ineffective, uneconomic, etc. Such common terminology ensures a better understanding within a group when processing risk.

Typical risks areas are:
- failures in business processes or suppliers.
- loss of key people.
- actions by competitors.
- changes in customer requirements.
- new developments in technology.

This paper does not deal with stock market investment risks or any form of gambling. It is concerned with risks to a business or to a project that require the involvement of the people concerned to define them fully and to assess their importance.

3.1 Why conduct a risk assessment?
Most businesses would articulate the following reasons for their increased focus on risk management:
- management’s desire to better understand and manage group wide risk
- adding value to the business
- avoid major business failures/surprises
- help drive management accountability for risk
- establish an effective structure and process of risk management embedded fully in the business
- Support Corporate Governance requirements.

In reality, however good the plan, things go wrong. Competent and professional managers will want to ensure that these risks have been evaluated.

4. The Development of the Theory of Risk Management
There are three particular aspects to briefly discuss:
1. statistical theory as it effects Risk Management, to the level that workshop participants are likely to need
2. the practicality of applying this theory to large numbers in the real world
3. theoretical efforts to evaluate how people in practice take risk decisions.

The techniques of Risk Management have been developing for thousands of years. Bernstein [2] describes what might be termed clauses for insurance contracts dating back to 1800 BC. By the fourteenth century AD many major European cities had established financial centers – and merchants were already complaining at insurance brokers being more willing to take in money than to pay out after a disaster! By the sixteenth century, some European cities were selling annuities as a means of raising revenue. The coffee house that was to become Lloyds of London was opened in 1687. Many current insurance companies date back to the eighteenth century.

Statistical methods developed in parallel with the risk taking businesses.

4.1 Probability and statistics
The theoretical work to support risk analysis as considered in this paper seems to have started in the seventeenth century when the first books on probability theory were published, according to Bernstein[2]. Much of the focus was on gambling probabilities, specifically dice.

Hacking [5] quotes a book published in 1662, ‘La logique, ou l’art de penser’ (Logic, or the Art of Thinking) which contained the key sentence, “Fear of harm ought to be proportional not merely to the gravity of the harm, but also to the probability of the event.” This fundamental statement was written when Pascal and Fermat were leading figures in the world of mathematics (Hacking credits Pascal with having “invented decision theory”). Over 300 years were to pass before Nunamaker developed the technology that would implement this concept and for Hailstones to apply this technology to risk assessment.

Key to interpretation of the output of the process described in this paper is consideration of dispersion about the mean. De Moivre described the distribution that we know today as the normal distribution early in the eighteenth century (in a book dedicated to Isaac Newton).

Also in the eighteenth century, Bayes stated his logical principle concerning the probability of whether events will happen in the future based on our knowledge of similar events happening, and not happening, in the past.

However, to apply statistical formulae in practice, some real life numbers are needed.

4.2 Collecting the numbers
The first significant collection of demographic data appears to have taken place in the seventeenth century to support the burgeoning annuities business. Hacking [5] describes the work by a John Graunt published in 1662 that drew inferences about the death rate in London from local records.

Stigler [11] describes the work of Quetelet and others in the mid nineteenth century to apply statistical ‘ratios’ in attempting to draw conclusions about the population of Belgium based upon sample data from France. Fundamental doubts emerged that accurate
results could be achieved by applying statistical theory to 'social' rather than scientific data.

Such doubts are illustrated by Stigler [11] in an excerpt from a statistics syllabus at King's College London in 1885: “…the Calculus of Probabilities (is) a dangerous but powerful weapon, which requires not only skill in handling mathematical formulae but also judgment to determine how far mathematics are applicable to each class of phenomena. Formulae founded upon games of chance are to be transferred with caution to real life.”

In general, even if the participants in a risk management workshop are able to discuss whether a particular pattern of events was a Gaussian or a Poisson distribution, or read off confidence intervals from a t-Table, it is unlikely that they could ever develop statistically sound measures of business risks. Further developments in statistical theory in the twentieth century have not resolved this limitation.

Hence, however rigorous the statistical theory attempts to be, personal judgment will be required in real life business situations.

### 4.3 Personal judgment

Hacking [5] points out the duality of statistical probability: “On the one side it is statistical, concerning itself with stochastic laws of change processes. On the other side it is epistemological, dedicated to assessing reasonable degree of belief in propositions quite devoid of statistical background”.

Bernstein [2] quotes Keynes on the second of these alternatives: “Most of our decisions to do something positive . . . can only be taken as a result of animal spirits . . . and not as an outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities.”

However, even decisions based on “animal spirits”, if they are in a business context, must be susceptible to some sort of analysis. This is the concept of ‘utility’, first instanced by Daniel Bernoulli’s in his solution in 1738 of the so-called St. Petersburg Paradox. This paradox related the value that people might be expected to ascribe in a coin tossing game for which the payoff was in theory infinite. In tackling this, Bernoulli also developed the concept of diminishing marginal utility, that people’s ascribed value would be less than the theoretical expected return, depending on what wealth they already possessed.

Asch [1] has shown how people’s judgments are influenced by their peers, even to the extent of people giving clearly incorrect answers to simple and definitive questions, simply because other people gave wrong answers (in these experiments the ‘other people’ had been primed to give wrong answers).

Hertz [6] analyzed business executives’ attitudes to risk, and illustrated that peoples’ unwillingness to take risk in a business context might be counter-productive for the business, in that people were unwilling to take risks that would be advantageous to the business.

Weatherall [12] concluded, “No decisive theory exists which will satisfactorily indicate, on an analytical basis, the optimum decision in a situation of risk.”

### 5. Business audit and control

Another dimension to business risk is the developing legal/regulatory requirement from the Listing Exchanges for risk to be more transparently managed and shareholders rights more effectively monitored.

In the UK this has been driven by a recent history of major corporate failures from what was perceived to be avoidable risk, and the consequent high profile public condemnation of the poor level of corporate standards, including risk management. Such failures can arise directly from senior executive malpractice, lack of challenge from Boards or an environment of lack of transparency on how the companies were managing risks to shareholders interests. The impact has been at times catastrophic; the companies were exposed to such major risks that in one case, the UK’s oldest Bank went bankrupt, and in another, several thousand pensioners lost their pensions.

Various committees were set up in the UK to better regulate Governance issues (for example, Cadbury, Greenway, Turnbull reports in the UK). The Institute of Chartered Accountants in England and Wales [7] stated in its guidance of directors (this document was formally welcomed by the London Stock Exchange):

“In determining its policies with regard to internal control, and thereby assessing what constitutes a sound system of internal control in the particular circumstances of the company, the board’s deliberations should include consideration of the following factors:

- the nature and extent of the risks facing the company;
- the extent and categories of risk which it regards as acceptable for the company to bear;
- the likelihood of the risks concerned materializing;
- the company’s ability to reduce the incidence and impact on the business of risks that do materialize; and the costs of operating particular controls relative to the benefit thereby obtained in managing the related risks.”
The ICA adds that, “It is the role of management to implement board policies on risk and control. In fulfilling its responsibilities, management should identify and evaluate the risks faced by the company for consideration by the board and design, operate and monitor a suitable system of internal control which implements the policies adopted by the board.”

This extract illustrates the requirements for directors and executives to implement the sort of process described in this paper, whatever the pattern of risks that they face. It is not sufficient to make a subjective judgment that the risks are reasonable, and then cross one’s fingers!

As a business process, Risk management is now maturing:

- risk is now on a Board's radar; the company’s risk profile will be regularly revisited
- Boards want a clear understanding of the risk appetite of the group so they can decide and calibrate it for decision-making purposes
- risk is also now seen as an opportunity
- risk is managed in an integrated, enterprise-wide fashion rather than hitherto in silos
- risk management responsibility is now accepted by senior and line management
- risk is more explicitly measured and quantified, e.g. likelihood and impact of risk
- risk management is now more integrated into corporate management reporting systems.

6. Why use a GSS for Risk Workshop?

Hence, Risk Assessment is an essential process, yet techniques for accurately describing risks and for assessing their impact do not exist. The people involved, almost by definition, will not have the expertise to accurately assess all risks, yet the assessment of priorities and subsequent actions need to be supported by them with a reasonable consensus.

In this context a GSS has the following specific benefits:

- equal participation and opportunity to contribute. All risks can be entered and evaluated.
- significantly less time is required than in a conventional flip-chart based workshop. Reducing the time required means that senior and busy people may be able to attend rather than their stand-ins with less knowledge and limited decision capability.
- increased openness and creativity (from the capability for anonymous input)
- enabling ‘sacred cows’ to be called into question
- clearly defined action plans for follow-up
- clear recording of the electronic discussion and the results of the session.

With a GSS it is easy to pass results from one meeting to another in a coherent manner. For example a hierarchy of meetings can take place, either top-down or bottom-up. The bottom-up process starts with junior groups assessing risks and passing any that they can’t handle up the chain; hence when the Board meets, they can be presented with a starter set of risks that need their attention. The top-down process starts at Board level, with risks being handed down to be dealt with.

Hence the benefits of using a GSS are clear and, given any reasonable scale of risks to be dealt with, these benefits have a real business value.

6.1 Prior reporting of the use of GroupSystems in Risk Workshops.


7. The GSS-supported Workshop for Risk Assessment

There are three key stages to the workshop:

- Pre Workshop Preparation
- The Workshop itself
- Post Workshop Delivery.

Within the workshop itself are the following main components:

- Agree the Business Objectives – risks can only be defined in the light of common agreement as to the objectives.
- Enter the Risks – participants work together in parallel.
- Merge and categorize risks – inevitably there will be overlaps in what has been entered. Categorizing risks helps to manage them.
- Assess the risks – the likelihood of the risk occurring and the impact if it does.
- Review the controls that are in place – some risks will be already covered to some extent.
- Define actions – either to deal with the risks or to assign responsibility for further work.
- Participant feedback – participants view of the meeting and suggestions to improve the process.

7.1 Pre Workshop Preparation

This is essential to the success of the event. Typically, it involves:
• Develop the workshop with the client sponsor; the Theme, Objectives, Structure, Process, Timings and Outputs.
• Interviews with the attendees, or at least a selection of them, as well as a number of other functional / business heads to understand the key risk issues BEFORE the debate on them. This allows time for research as required.
• Reviews of bio’s of participants and an insight into the personal interfaces and politics to ensure that the facilitator is well prepared.
• Surveys of a wider client population (maybe 50 or so) on, for example, the effectiveness of the existing risk control framework; how good is it?

In order to ensure a sound basis, the workshop proper may start with a review of the business objectives.

7.2 Agree the Business Objectives

It is often worth checking that workshop participants are clear about what their business objectives are (in relation to the subject of the workshop). One technique for doing this is to list the objectives and ask participants to comment on them, for example whether they are attainable. A more direct method is to have the participants vote on the objectives - with the possibility that a negative vote result could stop the Risk Management discussion in its tracks!

Some Risk workshops start by defining from scratch the objectives of the project or business.

7.3 Enter the Risks

Having agreed on the business objectives, participants are now invited to describe what risks they see to the business or project. This list might run into hundreds.

Participants should enter well defined risks. For example (a real one), ‘systems’ is not a well defined risk, whereas ‘computer systems may not prove easy for customers to use for direct entry of their orders’ is better defined.

An example of a screen of risks (in fact risks to the running of a GroupSystems meeting) is shown in Figure 1.

![Figure 1. Risks as entered by participants](image)

7.4 Categorize the risks

Categorization helps in:

• breaking a large list of risks into manageable sub-lists.
• assigning responsibilities for different areas or types of risks.
- grouping similar risks together for ease of assessment.

Patterson [9] has described using the business objectives as categories. Some organizations use a list of departments or of business processes, such as Operations, IT, HR, Sales.

Figure 2 shows a set of categories, the risks in one of the categories being displayed.

![Figure 2. Categorized Risks](image)

### 7.5 Assess the risks

Participants are now invited to assess these risks using two criteria, likelihood and impact. As discussed in Section 3, a considerable degree of judgment is involved even for participants who are very knowledgeable on a particular risk. It is important that the participants come to some measure of agreement so that any resulting actions are well supported. Risks that have a technical content beyond the competence of the participants in the current meeting can be passed on for assessment to another group by the simple technique of not voting on them (for example Chapman and Ward [3] discuss the different likelihoods and impact of ‘wet’ versus ‘dry’ buckles when laying pipes in the North Sea).

Various scales can be used in this assessment process. The simplest is a choice of low/medium/high. This simple scale is partly a leftover from the days of flip charts when vote summaries had to be prepared manually, but it also reflects a judgment on the ability of typical workshop participants to make precise judgments. A more flexible scale is a range of 1 – 10.

Even more precise is a 10 point logarithmic scale, whereby each increase of a point corresponds to a 10-fold increase in the measure. Thus with a ten point logarithmic scale, the range for impact could go from a single unit of currency to 10B units of currency.

It is of course unlikely that any single Risk Management meeting would cover both ends of this scale, but using this scale can give an effective reality check and also allow easy comparison between the work of different groups (a significant advantage compared with the low/medium/high scale where the same words would cover radically different values depending on whether the Board was reviewing risks or a much more junior group).

Estimating likelihood may often seem more difficult than estimating impact. For example, one can roughly calculate the financial effect of competition getting to the market first by supposing a reduced price or a reduced volume of sales, but it can be very difficult to put any sort of number to the likelihood of this happening. The process described in this paper will...
help in this situation, since if the impact of a risk is judged to be high, this will suggest that actions be put in place to further explore the probabilities.

In assessing likelihood it can be helpful to think about frequency, “How often do you think this is likely to happen?” With a logarithmic scale one can assign a scale from once an hour to once a century.

It is common practice to assess risks without considering what controls are in place. This allows an evaluation later in the process as to whether a risk is being over-covered, for example an expensive contract may be in place to buy raw material at some future guaranteed price when the impact of a price increase may be less than the cost of the covering contract.

Typical results of a vote on likelihood and impact are shown in Figure 3.

![Figure 3. Display of risks, showing likelihood and impact of risks in different categories.](image)

A classification into the four quartiles of the scatter diagram is useful. The critical risks are generally in the top right quartile.

When analyzing middle range voting results, it can be important to look at the details, as in Figure 4.

![Figure 4. Display of Cell Summary, showing the details of the votes.](image)

Clearly an average of 5 can be an average of votes of around 5, indicating agreement, or an average of votes of 1 and 10, indicating lack of agreement. Any disagreement may be based on real disagreement about a risk or maybe a misunderstanding of the meaning of the words.

After discussion, the votes can be updated to see if consensus has improved.

### 7.6 Review the controls that are in place

The high priority risks can be identified in the display shown in Figure 3. A next stage can be to describe for each important risk the controls that are already in place. This provides input to action planning.
7.7 Define action plans

It may be the role of a particular meeting only to define and initially size the risks, leaving the detailed work to others.

If the meeting is to define what actions are required, one approach is to classify risks, based on the vote results:
- **retain** – keep these risks in the business, managing them carefully
- **transfer** – often by insurance
- **recover** – formulate cost-effective recovery plans, (e.g. from catastrophic events).

Having developed an action plan, the process can now revert to normal business control and review process.

As discussed in Section 2.2, GSS can have a further role with the use of ‘distributed’ meetings, in contrast to the ‘face-to-face’ workshop currently being described. Distributed meetings can update feedback, actions and opinions in parallel, thus maintaining effective communication between the group members.

7.8 Participant feedback

It is a familiar feature of Electronic Meetings to have an anonymous survey at the end of a meeting or workshop. This can measure participants’ commitment to the output of the meeting and, crucially, collect their suggestions to improve future workshops.

7.9 Post Workshop Delivery

If there is no follow-up post workshop delivery, an albeit highly regarded experience by the participants can wither away. Managers are ‘...busy people...’ and there needs to be a clearly structured post workshop process for developing the Action Plan and integrating actions including:
- Specific Actions
- Responsibilities / lead manager
- Timescales
- Costs
- Benefits ( Improved Assurance or Added Value )

Normally this process takes 3 to 4 weeks to develop and most organizations will ‘farm out’ the responses to the workshop participants in order to leverage the experiences gained and maintain continuity. During this period clients normally need support and coaching - the exercise does not stop at the end of the workshop.

8. User experience and response

User experience over hundreds of such workshops in many countries has been extremely positive. Some organizations have run numerous risk assessment workshops, covering different levels and aspects of their business.

A common comment proffered by participants at the end of a risk workshops is to the effect that “…we have never really looked at risk in this way; it is always on our agenda for Board meetings but usually narrowly focused and project/topic specific (for example, the risk of implementation failure of a new ERP) and not related to the wider, more specific business objectives…”

User experience indicates that the knowledge sharing and synergizing is an enormous side benefit from the workshop process. Skilled facilitation, together with the software’s consensus analysis tools, enables the group to identify where there is low consensus. Analysis of voting patterns in workshops suggests that least consensus arises under the following circumstances:
- early on in a workshop when knowledge is not yet exposed and shared
- on technical issues such as I.T., where it appears there is little understanding of the risk or its impact
- softer emotional issues, around for example human resources risks. Culture risk is a good example of how a somewhat major risk can be perceived very differently within a group.

9. Lessons learned

Experience and feedback over hundreds of such workshops indicates that there are a number of prerequisites to running a successful risk workshop:
- select relevant and topical subject matter (from the client’s perspective) for the risk workshop. This engages interest and demonstrates the potential for adding value.
- careful preparation is required – capture as much data pre-workshop as possible and pre-populate risks to maximize time spent in discussion and decision mode.
- link the workshop to an existing initiative within the organization.
- get the timing of the workshop in line with the organization’s business cycle.
- engage the right people – the workshop really adds value when participants share knowledge and experience; the technology supports the process by speed of focus but does not by itself provide answers. ‘Right people’ covers attitude to collaboration as much as professional background or managerial rank.
- facilitation expertise – a combination of facilitation skills and relevant business knowledge is needed. This may suggest co-facilitation if both are not present in one individual - or when working with larger groups.
- have a clear road map, including ‘...what happens next...?’ as well as the workshop structure itself.
• don't leave them hanging! Identifying risk is the easy bit for most managers; consensus on change, the need for it and the change itself is less easy. Leave them with at least a clear articulation of the group view on change.
• commitment to change – without it there must be a question on the value and wisdom of embarking on the process from the outset.

These prerequisites can create a platform for engagement and ownership of the risk assessment process which is critical to success.

The prerequisites are each important but the cross-business representation is the one that really makes the workshop process catch fire.

10. Summary

This paper has shown that a Group Support System does have exceptional capability for Risk Management and Assessment. The process for achieving this has been presented, with benefits and lessons learned.

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Appendix

Section 2 briefly described a Group Support System. The specific tools of the GroupSystems software that was used in the process described in this paper include the following:

Categorizer: allow participants to enter their ideas and comments. Comments can be added to ideas, either anonymously or not. Ideas can be categorized (i.e. grouped together) when appropriate.

Group Outliner: allows participants to add a structure of sub topics to each topic, up to 15 levels if required. This enables very clear and detailed group discussions.

Vote: a choice of single criterion voting methods, including a scale of 1 to 10, yes/no, true/false and a Likert scale from strongly in favor to strongly against.

Electronic Brainstorming: a tool to encourage creative and ‘off the wall’ ideas to be entered and developed.

Alternative Analysis: a choice of multiple criteria voting methods, including numeric votes, allocation of a fixed amount across multiple options and those described under Vote above.

Survey: a tool to allow flexible and speedy opinion surveys to be run.

References