In a recent article Professor Paul Nutt (2002) reported results from a study of over 400 decisions that had been made by managers in medium to large organizations in the USA, Canada and Europe. He had interviewed key participants (including the manager making the decision) over a two-year period after the decision was made. Surprisingly, over half of the decisions failed. The decisions were never implemented or subsequently unraveled during the two-year observation period.

What was the cause of these failed decisions? To answer these questions, Professor Nutt collected data on many aspects of the decision process which were subsequently used to predict the ultimate success or failure of the decision.

Some of the predictors of decision success pertain to deficiencies in the technical aspects of the decision process. Inadequate framing of the problems and premature closure on a solution are typical examples, but the best predictors of success or failure could be found not in cognitive processes but in social ones. These included the degree of involvement and participation of key stakeholders in the development of the problem solution.

Decisions that used participation to foster implementation succeeded more than 80 per cent of the time.

Nutt’s findings remind us that effective decision making is not merely a matter of decision quality but also of ensuring that the decision will have the necessary support and commitment for its effective implementation. In this sense decision making merges with issues of leadership, particularly the degree and manner in which a leader involves others in the decision-making process.
began convinced that the key was to identify the conditions under which participation “worked” and those under which it “did not”. Writing in the Handbook of Social Psychology, I wrote that:

The critics and proponents of participative management would do well to direct their efforts toward identifying the properties of situations in which different decision making approaches are effective rather than wholesale condemnation or deification of one approach (Vroom, 1969, Vol. 5, p. 40).

Several years later, I began a program of research aimed at developing a normative model to guide managers through the task of matching their decision processes to the nature of the problem to be solved. This research has now spanned several decades, during which I have had many collaborators, both proximal and distal. The proximal contributors were Philip Yetton and Arthur Jago, both former students, who made enormous contributions at different times to the work (Vroom and Yetton, 1973; Vroom and Jago, 1988). The distal contributors include those social scientists in North America, Europe, and Asia who were stimulated to do research on various facets of the model. Several years ago Jago counted 150 publications in scientific journals and 47 doctoral dissertations each using our concepts and/or methodologies in the exploration of the link between decision making and effective leadership.

Various versions of the model have appeared beginning in 1973. Each of these begins with the assumption that the unit of analysis should be a specific decision problem rather than a generalized work role. Managers encounter a wide range of challenges in the course of a day, week, or month that may require very different decision processes.

We also assume that there are a finite number of such processes by which challenges or decision problems can be addressed. Throughout our research, we have distinguished five degrees of participation, the most recent of version of which is shown in Table I. The numbers at the top of the column describing each of the five processes refer to experts’ beliefs about the relative amounts of opportunity to influence the decision afforded group members.

>After reviewing the empirical evidence (Vroom, 1969; Vroom and Yetton, 1973), we identified four potential outcomes of participation. Two of these, the quality of the decision and the manner in which it is implemented, are components of decision effectiveness. Quality refers to the analytical aspect of the decision. A high-quality decision is one in which the action chosen is consistent with the goals of the organization and with potentially available information about the probabilities of actions leading to the attainment of these goals. Implementation of the decision is influenced by the degree to which group members understand and support the decision.

Apart from decision effectiveness, there are two other consequences of participation identifiable from the literature. Participation slows down the decision making process. The elapsed time required to make the decision generally increases with amount of participation. This is of particular importance in emergency situations where rapid action is a crucial component of success. In addition, group meetings, particularly those seeking consensus among divergent views, can “use up” endless hours, leaving proportionally less time available for implementing decisions or meeting the other requirements of one’s job (Vroom, 1969). Both of these aspects of time represent potential costs of the participative side of the decision making spectrum.

While participative decision processes consume time, they may increase human capital. It can provide a “training ground” in which people can think through the implications of decisions in anticipation of a later time in which they may be responsible for making them. Participation can also perform a team-building function building positive relationships among group members and helping to meld them into a team. Finally, participation can aid in aligning the individual goals of group members with the goals of the organization. We consider these factors, time and development, to be components of the efficiency of the decision making process.

As one moves from the left hand side to the right of Table I, each of these four outcomes (quality, implementation, time, and development) changes but seldom in a manner that is independent of the situation. Thus, in some situations, increased participation may jeopardize decision quality instead of enhancing it. There are occasions in which participation may elicit destructive conflict that will weaken teams rather than build them. And there are situations where decisiveness on the part of the leader is welcomed to a far greater
degree than the opportunity to participate in the process.

Figure 1 presents 11 situational factors which should, and do, influence managers’ choices of decision process. Using a simple scale of the kind used to measure weight as a metaphor, I depict the four conditions at the left as tilting the scale toward the autocratic
or non-participative side. Similarly, the five conditions at the right would tilt the scale toward the participative side.

But what about the two remaining factors (decision significance and likelihood of disagreement) at the fulcrum? These have more complex effects which can be thought of as the sharpness of the point of the fulcrum. Thus, increasing the significance or organizational importance of the decision increases its sensitivity to one or more factors on either the left or right. Similarly, increasing the likelihood of conflict or disagreement among team members can signal the need for more or less participation depending on the presence or absence of factors on the left or right.

Figure 1 shows the "building blocks" of a normative model, but is not itself a usable model. In the earliest phases of this work, our models were represented on a piece of paper. The most famous of these, the Vroom-Yetton model (1973), was represented as a decision tree with a set of situational factors represented as nodes and branches corresponding to the presence or absence of each factor leading to a recommended decision-making process. Jago and I published, 15 years later, a substantial revision (Vroom and Jago, 1988), which in turn led to the most recent version (Vroom, 2000; 2003). The two later versions capitalize on recent research and critical evaluations by managers who had used it on real decision problems.

These models are substantially more complex than that of Vroom-Yetton. While they can be reduced to a single piece of paper, such use requires "detuning" of their rather complex structures. On paper, less important attributes are eliminated, and other attributes are varied across diagrams rather than within a single diagram. Figures 2 and 3 illustrate the point. Arranged along the top of each of these decision matrices are seven situational factors. Two of the factors shown in Figure 1 (likelihood of disagreement and interaction constraint) have been eliminated, and two others (importance of time and importance of development) are treated as separate matrices. Figure 2 contains a time-driven matrix and Figure 3 a development-driven matrix.

To use either matrix you must have a decision problem in mind which is within your area of freedom or discretion. You must also have a specific group in mind which could potentially be involved in the solution of the problem. Originally we thought of the group as consisting of a manager’s direct reports or subset thereof, but experience has shown that the model also produces meaningful results for other relationships ranging from a CEO’s decision about whether and how to involve his or her board of director, to a parent’s decision about involving family members in planning the family vacation.

The time-driven matrix is intended for situations in which time is important and development is not a consideration. Likewise, the development-driven matrix is intended where there is abundant slack time and one wishes to invest in the development of the group.

To use either matrix, one starts at the left-hand side and looks for the presence or absence of each situational factor, selecting H (high) where the attribute is present, or L (low) where it is absent. In doing so, you may not cross any horizontal line. Thus you are forging a path toward the right-hand side of the matrix which, when reached, contains a recommended process.

In Table II, I have selected three cases to illustrate the use of the decision matrices. While they are very diverse in terms of their institutional setting, each depicts a manager faced with a decision problem and a group which could conceivably be involved in its solution. Submitting the same case to both matrices can be interesting. Sometimes the two matrices yield identical recommendations. When they differ, the development-driven model recommends a more participative process. If the two recommended processes do not represent adjacent points on the scale of participation, it means that the intermediate processes are also acceptable although not the fastest or the most developmental.

The recommended processes in the matrices shown in Figures 2 and 3 are not the result of armchair speculation. They are produced by four equations corresponding to the four outcomes of participation: decision quality, implementation, cost, and development. For example, predictions of the quality of the decision resulting from each of the five decision processes are based on where the problem-relevant knowledge resides (in the leader, in the group, both, or neither), the extent to which the goals of group members are aligned with the organization, and the competence of the team members in working together.

The final step involves combining the results of the four equations to yield a single recommendation. We make the non-arbitrary assumption that decision quality and

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implementation (the two components of an effective decision) are primary and the two components of efficiency (time and development) are secondary. Within those limits, the relative weights attached to the four factors are determined by judgments made by the decision maker.

It should be apparent that the decision matrices are a very crude device for accessing the potential power and usefulness of a model such as I have described. They are limited not only in the number of situational factors but also in the number of levels of each factor. In the real world these factors vary in degree, not just in their presence or absence.

For many years we have experimented with alternative devices that might be superior to paper representations. Back in the late 1970s, a Bell Labs engineer, Peter Fuss, developed a black box that looked promising. On the front...
of the box were a set of switches corresponding to the situational factors. The decision problem was described by throwing the switches, at which point one pressed a button which turned on one or more lights corresponding to feasible alternatives appropriately described.

Now, in the era of personal computers, the black box has been replaced with a CD-ROM. Figure 4 shows the introductory screen of a Java-based expert system. At the left-hand side are a set of menu options which explain various facets of the model (e.g. decision processes, situational factors, theory, equations, bibliography, etc.) or ancillary routines dealing with problem framing or team size and composition.

The heart of the program is labeled Situational Analysis shown in Figure 5. Here one rates the 11 factors (typically five levels on each factor) and then clicks the calculate button to get a bar graph showing the relative effectiveness of each of the decision processes. The ratings of the situational factors in Figure 5 correspond to the R&D problem from Table II. To further explore the tradeoffs among the four outcome variables, one can produce separate bar graphs for each outcome separately by selecting the tabs on the right-hand side of the screen.

Over the last 30 years, I have personally taught a version of the model to many thousands of managers in most developed countries in the world. On rare occasions I have had as little as half a day for what amounted to be a largely cognitive exposition of the model. In other instances I have had as much as five days to develop an understanding of the model and its underlying processes in more experiential fashion.

Earlier (Vroom and Jago, 1988) we described a systematic evaluation of effectiveness of a four to five day workshop in a single organization after a time interval of one to three and a half years. Data obtained for participants, superiors and subordinates, pointed to increases in use of participation, greater flexibility in leadership style across situations, and more concern with development of subordinates. Particularly encouraging was the lack of evidence of a...
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decline in effects with the passage of time. Those who had been trained three and a half years earlier were indistinguishable on all quantitative measures from those who had taken the workshop the previous year. These results are largely consistent with those obtained in three additional studies carried out by others (Zimmer, 1978; Smith, 1979; Böhnsch, 1991). Here I will offer a few more casual observations based on a wider range of experiences.

Most managers find the model impressive and the basic idea of modifying the process with the situation fits with their preconceptions. Furthermore, the rational way in which the model analyzes the decision and generates recommendations has a high degree of face validity. One CEO of a large organization sent a memorandum to all senior managers attaching a copy of a pencil-and-paper version of the model and recommending it as a guide for making effective decisions. Another senior government executive gave CD-ROMs to each of his managers and insisted that

| Table II |
|------------------|------------------|------------------|
| **Setting: Pulp and Paper Industry** | **Setting: Repertory Theatre** | **Setting: Suburban High School** |
| Your position: R&D Director | Your position: Executive Director | Your position: Principal |
| After receiving your PhD in chemistry from a major university, you joined a large pulp and paper firm and have gradually worked your way up to the position of director of research. Several years ago you persuaded top management to allocate the funds necessary to build a brand new research facility and to hire the brightest research scientists that you could persuade to work in the forest products industry. The scientists that you were able to hire are technically excellent but, unfortunately, have a strong preference for working on basic rather than applied research. You have succumbed to that pressure in order to keep this highly cohesive team satisfied. However, the pulp and paper industry, as a whole, has fallen on hard times, and you are finding it increasingly difficult to justify the contributions made by R&D to the bottom line. Recently, a new research problem with considerable promise has been promised by one of the operating divisions. Your group would be ideally qualified to work on the problem, but unfortunately, they are likely to regard it as devoid of scientific interest, while the projects on which they currently work provide them with much intellectual satisfaction. It will be necessary to get back to the operating division soon with a decision concerning what resources, if any, you can devote to their problem. In the past you have found this group of scientists to speak with one voice. If you can find a solution that satisfied one team member, it would probably go a long way to satisfying everyone on the team. Analysis: Time-driven: H H L L L – consult group DVPT-driven: H H – L L L – consult group |
| You are the executive director of a repertory theater affiliated to a major university. You are responsible for both financial and artistic direction of the theater. While you recognize that both of these responsibilities are important, you have focused your efforts where your own talents lie – on insuring the highest level of artistic quality to the theater’s productions. Reporting to you is a group of four department heads responsible for production, marketing, development, and administration, along with an assistant dean who is responsible for the actors who are also students in the university. They are a talented set of individuals, and each is deeply committed to the theater and experienced in working together as a team. Last week you received a comprehensive report from an independent consulting firm commissioned to examine the financial health of the theater. You were shocked by the major conclusion of the report: The expenses of operating the theater have been growing much more rapidly than income, and by year’s end the theater will be operating in the red. Unless expenses can be reduced, the surplus will be consumed, and within five years the theater might have to be closed. You have distributed the report to your staff and are surprised at the variety of reactions that it has produced. Some dispute the report’s conclusions, criticizing its assumptions or methods. Others are more shaken, but even they seem divided about what steps ought to be taken and when. None of them or, in fact, anyone connected with the theater, would want it to close. It has a long and important tradition both in the university and in its surrounding community. Analysis: Time-driven: H H L L H L H – consult group DVPT-driven: H H H L H – facilitate H H L H H – delegate |
| This morning the tranquillity of your suburban high school was shattered by an event beyond comprehension. A young, male student entered the school with a semiautomatic pistol and killed three classmates and wounded three others. Despite your many years as principal, there has been nothing in your background that has prepared you for the magnitude of this tragedy. The police have now left, and the students returned to their homes, but the task remains of figuring out what needs to be done in order to restore a sense of normalcy to the educational process. The problem seems enormous. The press is quickly descending on your small town and seeking statements from you and from your academic staff. There is the inevitable process of grieving that must be managed, and there are also curriculum matters, including the final examinations, which were set to begin next week. It is important to have a coordinated plan. You have summoned the department heads to a meeting in your office at 4 p.m. None of them is likely to have had experience in dealing with crises such as this. Furthermore, they are unaccustomed to working together to solve school-wide problems, preferring instead to leave them to your direction. However, you know that this event has had a unifying effect on the entire community. Analysis: Time-driven: H H L H L – consult individually DVPT-driven: H H – H H L – consult group |
they run the “Vroom analysis” before making all major decisions. However, there is a distinct possibility that teaching the model has affected managers’ “espoused theories” rather than their theories in action. Argyris (1980) has cogently observed the lack of relationship between what managers say they do and what they do in fact. Since the inputs to the model are managers’ judgments of their environment rather than its actual properties, there is much room for using the model to rationalize one’s actions rather than to make one’s actions more rational.

For example, a manager with an exalted vision of his or her own expertise relative to a group would be led by the model to more autocratic choices than a manager more modest in assessment of his or her talents. Vroom and Yetton (1973) studied this potential limitation. They took a set of real cases modified so as to be easily and unambiguously coded by experts trained in the use of the model. The cases were then given to a group of managers, each of whom was asked to to specify what they would do if they were the leader depicted in each case, and second, rate each case on the situational factors.
When managers accurately perceived the features of the case, their choices agreed with the model two thirds of the time. However, when they perceived the case incorrectly, the level of agreement between the model and their choices declined to only 17 per cent. It is not clear whether managers’ perceptions drive their actions or the reverse. Either way, it imposes limitations on the use of any model that relies on accurate and unbiased perceptions. Other analyses of the data reveal that perceptual errors were not the only source of ineffective choices. Of equal or greater significance was the way in which judgments were combined into choices. This represents the domain addressed by the model.

The lesson is clear. Didactic expositions of the model, exhortations to use it by their bosses, and/or user-friendly CD-ROMs are limited by their ability to address only the second source of errors. Those errors attributable to misperceptions require a different pedagogical approach.

One method that we have found to be useful involves the use of social comparison processes. Managers are given a set of cases (usually five or six in number) and asked to pick the leadership style that they would use in each. They are then organized into teams of five to eight managers with the instruction to attempt to reach agreement on the best style.

The cases are carefully selected so as to evoke different ways of thinking, and managers are encouraged to use the differences as the basis for learning about their own and others’ perception of the cases and beliefs about the consequences of participation. Teams are instructed to reach agreement, if possible, and, if not possible, to vote. The results of each team are then posted along with those of other teams. Since each situation is real, the facilitator is able to describe what was actually done and the outcome, which in some instances was a great success and, in others, a remarkable failure. At this point, the facilitator assigns to each team the task of applying the model to each case. Typically, teams agree on the situational factors in each case and on the model’s recommendation even though it differs from their own choice. They are then instructed to consider the factors that they overlooked that influenced the model, and any factors that they might have considered that the model overlooked.

A similar method has been used by managers with their own teams back on the job. A case is selected to be read by each person prior to a staff meeting. The case might be a written case or a real decision faced by one of the participants – including the manager. Prior to the meeting, each person decides on what they believe to be the best decision process. In the staff meeting, they compare choices and their respective rationales. Finally they “test” their instincts against the model, usually in its computer-based form. These processes typically encourage managers to reflect on their biases and assumptions about leadership. Learning that others view situations differently can serve to reduce the perceptual errors which cause misuses of the model.

Even more effective in educating managers in the effective use of participative methods is a device that we call a problem set. It is composed of a set of 30 cases similar to those shown in Table II. Each case depicts a manager faced with a decision problem and a group or team of associates who could potentially be involved in its solution. For each case, the manager must choose from the alternatives shown in Table I the processes that he or she would employ. The cases vary in institutional setting and in the nature of the challenge faced by the manager.

Of greatest import is the fact that the cases vary in eight of the 11 situational factors used in the model. Furthermore, each factor is varied independently of each other factor, resulting in a multi-factorial experimental design. This feature makes it possible to estimate which factors influence each manager’s choices and which he or she ignores.

Managers are instructed to read the 30 cases in advance of the workshop and to record their choices on a form provided for the purpose. Then the manager’s choices are entered into a computer program which we call LESTAN (Leadership Style Analysis). Usually the managers’ choices are entered into a file along with those of the other participants in the workshop. However it is technically possible to compare a manager’s choices with hundreds of files corresponding to many different kinds of organizations in many different countries.

LESTAN produces a detailed five-page report for each participant. The first page shows where the manager stands in relation to his or her peer group on the scale of participation shown in Table I. The second page compares his or her choices with the normative model. This is done separately for each of the 30 cases. Then the equations built into the model are used to evaluate the extent to which the manager’s pattern of choices are likely to produce high-quality
decisions and effective implementation of those decisions. These two components of decision effectiveness are largely independent of one another. Many managers involve others mainly to secure needed facts and information, and thus do very well on achieving high-quality decisions but pay insufficient attention to implementation. Others involve their team primarily to motivate others and gain their support but, in so doing, may risk decision quality.

Managers are also evaluated in terms of their efficiency in reducing the time required to make decisions as well as the extent to which their choices are likely to further develop the capabilities of their teams.

Pages three and four make use of the experimental design features of the problem set to reveal the situational factors that each manager ignores and those that influence his or her choices. Such influence is typically in the direction indicated by the model, but in some instances is in the wrong direction for optimal effectiveness.

The fifth and final page shows the manager his or her most problematic choices among the 30 cases and indicates whether the risks taken are likely to jeopardize decision quality or implementation. Finally, each manager is given individualized recommendations about changes in their behaviors that would help them to be more effective. There are over 20 “red flags” which can be triggered in LESTAN, reflecting consistent patterns of choices which are believed to be ineffective. Each red flag is linked to a specific recommendation about behavior change. Sometimes managers’ choices are such as to avoid triggering any red flags, and they get a congratulatory message. However, the vast majority receives as few as one, but as many as eight or nine, recommendations.

The feedback typically occurs toward the end of a workshop, well after managers have been trained in the concepts of the model. It is commonplace to see managers who believe that the model is the way in which they naturally operate, discover from the feedback that such is far from the case.

In recent years I have become convinced that cognitive expositions of the model and computer programs like Expert System are largely ineffective in producing behavior changes unless accompanied by experiential activities such as those that have been described. The models that my colleagues and I have developed are interesting tools but become effective in changing behavior only when accompanied by a pedagogy aimed at encouraging thought and self reflection by managers.

Much behavior becomes a matter of habit rather than choice. Methods and actions are selected without reflecting on their consequences. Habituation of action obviously has a function. It reduces the need for choice and enables us to act quickly. However, habits typically reflect the learning environment at the time the habit was formed. As long as the environment is unchanging, this property is fine. But in a changing world, such as that which most managers currently experience, habits can be troublesome.

Educating managers to think intelligently about participation and its uses and pitfalls is critical to reducing the high failure rate in decisions reported by Professor Nutt at the beginning of this paper. Having models of when and when not to employ participation can be a useful guide, but its real utility is likely to be realized with educational activities designed to encourage managers to examine and reflect upon their own assumptions about leadership and the ways in which their existing behavior patterns may fall short of what is needed in today’s world.

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