

VALUE ASSESSMENT OF TEAM PROBLEM SOLVING

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ABSTRACT

This paper describes early up front assessment of several team problem solving styles. The styles are assessed by ranking their problem solving quality, cost and value.

INTRODUCTION

Teams not achieving an extraordinary problem solving relationship of quality and cost are a root cause of unnecessary cost and less than satisfactory value, Figure 1.

Extraordinary Problem Solving Essential



Figure 1

Before working real projects, an early up front value assessment is needed to provide an indication of problem solving performance since it is essential that the quality of team problem solving be better by at least the additional cost of the team. A value assessment of problem solving performance during the beginning hours of a value workshop allows a value practitioner

to really know and positively respond to team and individual weaknesses and strengths.

An "ice breaker" ranking exercise is used to directly assess the quality of team problem solving performance. The resulting individual and collective scores provide a relatively simple and

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easy way 1) to measure and 2) to appropriately raise the quality, lower the cost and improve the value of team problem solving.

ASSESSMENT EXERCISE

Assessment exercise problem solving is similar to Value Workshop project problem solving. The exercise is called "Lost at Sea." Another nearly identical exercise is called "Lost on the Moon." The assessment exercises "Lost on the Moon" and "Lost at Sea" are interchangeable. They both require correctly ranking 15 items.

"Lost on the Moon" and "Lost at Sea" exercise scores frequently are used to excite and motivate workshop participants. As will be shown, exercise scores also can and should be applied to indicate a value assessment of team problem solving.

Scoring Calculation

To score the assessment exercise, ranked results are directly compared to the correct ranking. For each ranked item the absolute difference in its ranking compared to its correct ranking is calculated. The sum of the calculated absolute differences is the ranking score.

Using this procedure with no additional calculations, the best ranking score is the lowest. That is: zero is a perfect ranking score. The chance of scoring a perfect score by randomly ranking all 15 items correctly is remote. It is one divided by 15 factorial (15!), a million million to one long shot, a chance of less than 1 in a trillion (10^{12}).

Unlike the best score (0) with completely correct ranking that can occur only one way, the worst score can occur more than one way. Whatever ways the worst score occurs, and there are several, 112 is the worst ranking score possible.

Ranking score estimates were calculated using a Monte Carlo computer model to simulate guessing, random ranking. If the problem solving style used for performing the exercise is random guessing, the calculated average ranking score is about 75. That is, the chance of guessing a ranking score better or worse than 75 is about 50%. The chance of guessing a ranking score less than 40 is about one in a thousand or 0.1%.

Normalizing Procedure

Scores with a range other than 0-100 can be a technical or emotional roadblock for some persons. "Upside down" scores with zero the best score have a similar difficulty. To obviate these roadblocks, ranking scores were normalized from 0-100 with zero the lowest and worst normalized ranking score and one hundred the highest and best normalized ranking score. Scores presented and discussed in subsequent sections of this paper are normalized ranking scores. The procedure to determine these normalized ranking scores follows:

Subtracting ranking scores from 112 changes the best score from lowest to be the highest. Multiplying by the factor $(100/112)$ normalizes all ranking scores to a base of 100. The desired result is the lowest normalized ranking score, zero. One hundred is the highest normalized ranking score, the best score.

Using the above normalizing procedure, the estimated random average normalized ranking score is $33 = (112 - 75)(100/112)$. That is, the chance of guessing a normalized ranking score of better or worse than 33 is about 50%. Also, the chance of guessing a normalized ranking score better than $64 = (112 - 40)(100/112)$ is about one in a thousand or 0.1%.

SCORES

For brevity and ease of understanding, assessment exercise normalized ranking scores are presented for only one Value Workshop, Table 1. Non-attribution is a problem solving norm. Therefore, the scores of the Value Workshop, its teams and their members are and will remain not specifically identified.

For each team, the range of scores when performed by its team members as independent individuals is indicated by individual maximum and minimum scores. Team scores are shown as team average and consensus scores. The team average score is the sum of its individual team member scores divided by the number of its team members. The team consensus score is the result of asking team members to work the assessment exercise together and collectively perform problem solving.

Normalized Ranking Scores

<u>Team</u>	<u>Individual Max/Min</u>	<u>Team</u>	
		<u>Average</u>	<u>Consensus</u>
A	65/46	55	77
B	79/48	60	84
C	63/37	54	63
D	89/51	63	82
E	73/55	63	80
F	77/60	65	61

Table 1

PROBLEM SOLVING STYLES

Different problem solving styles produce different results, some much better than others. There probably are at least as many problem solving styles as there are people. Assessment exercise normalized ranking scores from the Value Workshop provide an indication of the existence and non-existence of some of the more dominate problem solving styles, Table 1.

Crowd

A team performing randomly by guessing without cognitive effort is crowd problem solving, a rabble, a disorderly group of people. Crowd problem solving by guessing, scores both above and below the random average score of 33, was not a style adopted by Value Workshop teams or their members. The lowest individual score was 37 and the lowest team score was 54.

Individual

Problem solving conducted solo by each team member is individual problem solving. It has the largest range of scores. This great diversity of scores is both a weakness and strength of problem solving by independent individuals. Scores varied from a maximum of 89 by an individual in Team D to a minimum of 37 by an individual in Team C.

Warlord

A variant of individual problem solving is warlord problem solving. In the extreme, the warlord completely overpowers a team by requiring it to adopt his or her problem solving. A warlord "fire fights" people and problems. The warlord problem solving result, right or wrong or somewhat in between, often is a slam dunk.

At least one warlord is present in Team F. This warlord and possibly associates are exceptional, in a negative sense, since they have the worst or nearly the worst problem solving performance on their team as indicated by Team F's individual minimum score of 60 and its team consensus score of 61. Team F had an opportunity to have a much higher team consensus score since its warlord(s) did have some problem solving skill. Team F's individual minimum score of 60 was the highest of all the individual minimum scores of the 6 teams. Also, of the 6 teams, Team F had the highest team average score, 65.

Team consensus scores near or below the team average indicate the presence of a less than satisfactory "What happened here?" problem solving style. An example is the warlord. Team average and team voting problem solving styles are other possibilities and are discussed next.

Team Average or Voting

The calculated sum of all the individual teammember problem solving scores divided by the number of team members is team average problem solving. Team voting produces results similar to team average problem solving. Teams not aware of team consensus problem solving frequently use team voting. Voting was not a problem solving style used by the teams of this Value Workshop.

Team average problem solving reduces the range of scores. A team average score of 65 by Team F was the highest. A team average score of 55 by Team A was the lowest. The team average range for the Value Workshop was 10 = (65-55). The Value Workshop individual problem solving range was 52 = (89-37).

A large reduction in team average range can indicate that some individual problem solving has the benefit of help from team associates. This should be encouraged as we will see when team consensus problem solving is discussed next.

Team Consensus

Problem solving conducted together as a team and continued until agreement is reached, an accord by all team members, is team consensus problem solving. Team consensus problem solving is something like trial jury deliberations that continue until a decision acceptable to all members of the jury is reached.

Team consensus problem solving is superior to team average or voting problem solving. While all teams, except for Team F, have consensus scores better than their team average scores, Teams A, B and E have extraordinary consensus scores better than their best team member. Unfortunately, many teams do not perform at this extraordinary level of team problem solving. The team dynamics of consensus problem solving are difficult for both team leaders and members to perform and can be improved by specialist facilitation.

Expert

A variant of individual problem solving is expert problem solving. Expert problem solving is performed by an individual who has much better answers than others. To be really effective, expert problem solving requires the expert also to be a leader and a catalyst. Sometimes needed leader and catalyst elements are provided by several team members instead of a single expert individual.

At least one expert was present in Team B. Team B has a consensus score of 84 that is 5 points above its best individual maximum score of 79 and is 24 points above its team average score of 60. Team A and Team E are two more examples of expert problem solving.

Experts with their superior understanding sometimes are just too good to accept. We fear what we do not understand. More than a few experts with superior problem solving skills are not leaders or catalysts and do not prevail. These experts are like an inverse warlord. Exercise scores indicate that at least one inverse warlord expert was present at the Value Workshop.

The maximum individual score of 89 for the individual in Team D is the highest of all the recorded scores but its expert did not prevail. However, this expert probably did assist his team since the Team D consensus score of 82 is considerably better than the team average score of 63.

"Better" can be the enemy of "best." For example, since the highest score of the Value Workshop was 89 by the best individual of Team D, 89 could be considered the best possible score but it is not. The best possible score is 100 and was not attained. A best possible score of 100 might be obtained with extraordinary expert problem solving, for example, if Team D did team consensus problem solving similar to Team A. Team A has a team consensus score of 77, 12 points higher than its best individual score of 65. Team D needs only 11 points higher than its best individual score of 89 to have a team consensus score of 100.

CAUTIONS

With the best of intentions, interpretation of data and observations can be misplaced. Our paradigms cloud reality. That is, facts and opinions sometimes are projections of inappropriate perceptions. Facilitators and value practitioners need to be alert for false expectations. Depending on perspective, similar data can have very divergent assessments. The outcome of these cautions is that team problem solving value assessments and their applications are not necessarily precise and require some careful common sense judgment.

VALUE ASSESSMENT

Team problem solving styles are assessed by ranking their problem solving quality, cost and value, Figures 2, 3 and 4.

Quality and performance are considered equivalent. The highest quality, lowest cost and best value are ranked highest; that is, best is ranked highest. Also, the quality, cost and value ranking assessments reflect what should and can be achieved. However as previously discussed, sometimes problem solving performance levels are not fully realized. For example, some experts do not prevail and team consensus problem solving sometimes is less than extraordinary.

Quality Ranking Assessment

- Expert Leader
- Team Consensus
- Team Average or Voting
- Warlord
- Crowd Random Guessing

Figure 2

Cost Ranking Assessment

- Expert Leader or Warlord
- Team Consensus
- Team Average or Voting
- Crowd Random Guessing

Figure 3

Value Ranking Assessment

- Expert Leader
- Team Consensus
- Team Average or Voting
- Warlord
- Crowd Random Guessing

Figure 4

Quality

Provided one can determine the specific individual who really is an expert, expert problem solving can provide the highest problem solving quality. Team consensus problem solving sometimes offers extraordinary problem solving performance better than the best individual on the team.

Team average or voting problem solving performance is good. Warlord problem solving quality generally is inferior. Crowd problem solving, random guessing, has the worst performance.

Cost

Expert and warlord problem solving are performed at lowest cost since the number of team members for these problem solving styles is one. Consensus problem solving costs more. Consensus problem solving, unlike the expert or warlord, requires a modest but competent team of three to six members.

Team average or voting problem solving could have a size of about 3-6 members but frequently requires 6-9 or more team members because of a "democracy run rampant" style of problem solving. Team average and team voting problem solving often cost more than most problem solving styles. A crowd problem solving style costs the most. Crowds generally are not teams but large groups of 10 or more people.

Value

Expert problem solving offers best value, highest quality at the lowest cost -- provided one can determine the specific individual who really is an expert leader. Team consensus problem solving offers nearly best value, extraordinary quality at a cost 3X to 6X more than expert or warlord problem solving.

Team average or voting problem solving value is poor. Its problem solving quality is good but at high cost. The value of

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warlord problem solving is marginal and less than it was years ago. Increased quality excellence world wide now is an accepted norm. Though warlord problem solving is low cost, its inferior problem solving quality is a serious weakness. Crowd problem solving, random guessing, value is worst. Its quality is the lowest. Its cost is the highest and seldom is affordable.

CONCLUSIONS and RECOMMENDATIONS

The primary function and the basic function for world class excellence is to improve value. What we need to do and what is recommended is that we really consider the relationship of quality and cost and more rapidly improve the value of everything we do. Quality was the watchword of the 80's. Value is the watchword of the 90's and beyond.

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