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“ICE” Analysis

Barb Clugh and Robert Soltysik

Abstract

Improving decision-making is a major reason for the growth and success of Organizational Engineering. This article describes an easy-to-use, method for estimating outcome probabilities in decision-making. It is useful in choosing between existing employees for positions, guiding training programs, improving workplace safety, as well as specifying and communicating management issues.

The program is named "ICE" (I-Opt Classification Evaluator) and is included with this issue. ICE employs advanced statistics in a way that can be understood and used by anyone working in a professional Organizational Engineering capacity.

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INTRODUCTION

All organizations are systems of groups. Each group is charged with a unique mission that serves the overall goals of the organization. Groups are composed of individuals moving in, out and between sub-units according to the needs of individuals, the group or the whole organization.

Viewed broadly and over time, organizations and their sub-units resemble ice floes in an ocean, constantly breaking apart and reforming amid ever-changing conditions.

However, unlike ice floes in an ocean, the constant reconfiguration of firms is guided by the conscious decisions of people. People must choose who goes where and does what. The number of decisions made in a typical Fortune 1000 firm each day is staggering. The sum of these decisions determines the ultimate success or failure of the firm.

Larger organizations have groups whose mission is to help optimize these decisions. These groups go under different names in different firms—for example, Organizational Engineering, Training and Development, and Human Resources Development.

Regardless of what they are called, these groups are hard-pressed to handle the volume of human transactions in organizations. As a result, they tend to rely on "one size fits all" mass training to satisfy their mandate. For example, classes in interviewing are included in management development programs. It is hoped that enough will be remembered to be of value when the time comes for the student to actually hire someone.

Organizational Engineering opens the door for new options to handle high transactional volume with precision. This capacity was first seen in the TwoPerson Analysis, TeamAnalysis and LeaderAnalysis technology. Here, human interactions in specific groups are quickly analyzed in detail using advanced computer programs.

ICE is another step in Organizational Engineering technology. It is a form of Discriminant Analysis, a well-understood and trusted method of analyzing the factors that differentiate one group from another.

CASE STUDY

The co-authors of this paper were principals in the initial application development of ICE technology. Co-author Barbara Clugh was confronted with a large department experiencing persistent difficulty. She was asked to use her Organizational Engineering skills to resolve the problems.

The department was charged with translating the output of an artistic staff into a format that could be run on large, automated presses. This pre-production group was experiencing retention and performance problems with some, but not all, of the staff members. The question was "what should we be looking for when hiring people?"

The first effort involved applying TeamAnalysis technology. This revealed that the group leaned toward structured approaches but there was much variation between individuals. The TeamAnalysis gave valuable information on how the group might make itself more effective, but did not identify the driving factors of individual success.

With the assistance of other professionals, co-author Clugh attempted to analyze the group member's strategic styles to see if some common factor emerged among more successful people. This effort proved overwhelmingly complicated even when limited to individual styles. Every time a factor seemed to emerge that might explain the difference in individual success, an example that contradicted it would also be found. The manual effort proved to be futile and frustrating.

Co-author Clugh contacted Dr. Gary Salton, the inventor of Organizational Engineering, who then referred her to Robert Soltysik—a trained mathematician and the other co-author of this article.

It turned out that the problem in the manual analysis was one of sorting strategic styles by their magnitude. Most people access each of the four strategic styles but use them in different strengths and combinations. It is almost impossible to pick up the patterns in

style values using manual methods. The permutations quickly exceed the limits of the human mind.

Co-author Soltysik reframed the problem as one of discriminating between groups of people. One group were people who performed well and tended to stay. The other group proved less skilled and tended to leave. The real problem was deciding which of these two groups a new prospective employee fell into.

Co-author Soltysik recognized that there was a well-established statistical method for addressing just this kind of problem. He proceeded to develop a statistical model to analyze the group in question.

The results of the analysis were eye-opening. We had reasoned that the creative nature of the process would benefit from a strong Relational Innovator (RI) style. The "production" demands had suggested that a fast acting Reactive Stimulator (RS) component would be valuable. This logic led us to believe that we should be looking for people with a Changer Pattern, the combination of these two styles. But that is not how it turned out.

We input the strategic style scores of people whose "success results" were known and used the model as a lens. It quickly became apparent that the "secret" factor was the Hypothetical Analyzer (HA) style. The reasoning of "why" this was true quickly followed.

People in pre-production convert the artist's work into a form that can be run by the presses. This requires that they understand the artist's intention. What is needed is translation, not substitution of the judgment of the pre-production people for that of the artist.

Looking downstream in the process, the pre-production people needed to understand the capacities of the presses on which the artwork was to be run. Again, understanding was the dominant quality needed for success.

Understanding is the natural "turf" of the analytical HA. Merging the artist's concept with the machine capability also requires the identification of options—a forte of the HA style. The need for the HA style in pre-production is now obvious, but this was far from clear before the ICE model was applied to hard data.

The "production" component of the function was also revealing. The ICE analysis revealed that the Logical Processor (LP) component of the strategic profile was the driving factor in this dimension—not the instant action of the RS as had been expected.

Again, the "why" quickly followed. Pre-production is a high volume activity. However, the artist's renderings were always presented in the same basic format, a greeting or celebratory card. The presses changed only infrequently. The creativity in the initial stages of the card making process had obscured the highly structured nature of the subsequent pre-production work. The ICE model saw this instantly and once it did, the reasons "why" again became apparent.

ICE confirmed that the other two strategic styles of Reactive Stimulator (RS) and Relational Innovator (RI) were also important—but only at a minimum threshold level. In other words, they were needed but not too much. Manual systems had not been able to

pick this up.

Organizational Engineering's strength is that it yields quantitative values. This is also what made the manual analysis difficult. The various combinations of strategic style strengths masked the critical underlying factors from manual analysis. However, the same quantitative capacity makes the data accessible to mathematics. Mathematics, in turn, allows otherwise invisible relationships to be accessed and used by the professional.

OTHER USES OF "ICE"

This application of ICE is only one possibility among many. Many workplace issues can be seen as a choice between two alternatives. Examples can include:

- High and low performer groups. New prospects can be evaluated for the group with whom they most likely fit.
- Or one group might consist of people who rarely have accidents and the other people who have them frequently. This could be important in insurance cost control as well as safety.
- Or one group might be successful management candidates and the other a group which did not work out as well.
- Or one group might be sales staff who are successful in a market and another group who did not fare as well in that market.
- Or one group might be people who get to work on time and the other people who arrive late. This might be useful in cases where timeliness is an important job component.
- Or one group might be people who get compliments from customers versus another group about whom complaints are received. This analysis might benefit Customer Service programs.
- Or one group might be people who have long tenure in a department and the other a group of people who exit early. This could help in retention management or succession planning.

The list of applications is limited only by imagination. This extension of Organizational Engineering technology can be useful whenever the issue being confronted is affected by strategic styles and which can adequately be specified with the addition of up to two more variables.

Any activity or condition that requires or benefits from communication between human beings will be sensitive to the strategic profiles. This means that ICE will apply to many, if not most, situations within which the Organizational Engineering professional works.

However to be used effectively, the professional Organizational Engineer should take care in defining the issue that is to be addressed using ICE.

DEFINING THE ISSUE

Non-professionals tend to look at organizational issues in a global fashion. For example, a Vice President of Finance is unlikely to fully recognize that strategic postures suitable for financial analysis may not be the same as those in General Ledger accounting. Except for technical requirements, effective managers will tend to be seen as interchangeable.

The less structured the area being addressed, the less likely it is that strategic profile distinctions will be noticed. For example, the VP of Sales is even less likely than the VP of Finance to recognize that different markets could require different mixes of strategic styles.

For example, successful sales people who directly approach business owners are likely to employ the RS style. Business owners are typically time sensitive and can make decisions without hesitation—a posture well suited to the low detail approach of the RS strategic style.

On the other hand, sales people working with an engineering function of the client organization (e.g., in automotive OEM sales) typically fare better if they favor an HA strategy. OEM engineers have to balance many options to reach performance objectives. They value the alternatives and assessments that the HA offers as a natural consequence of the HA style preference.

When viewed through the lens of Organizational Engineering, the distinctions between the two kinds of sales are easily seen. However, the high organizational perch of the VP of Sales can obscure analytical vision. After all, both groups sell the same product and it is easy to think of the sales people as interchangeable.

Organizational Engineering can help executives "think through" this type of issue. Specified correctly, ICE will be a valuable addition to a firm's sales arsenal. Specified incorrectly, the method will work some of the time and fail others. While still providing a positive return, ICE will not have lived up to its full potential.

Therefore, the first responsibility of the professional organizational engineer applying ICE technology is to specify the issue being addressed. This means that the organizational engineer probably needs to understand the area of concern better (at least within the organizational dimension) than the operating executives themselves.

This differential in knowledge is not an unusual condition. Architects know more about a building than does the building owner. Physicians should know more about your body than you do. Similarly, Organizational Engineering professionals should know more about organizations than do the people running them.

DEFINING THE PROBLEM

After defining the area of interest, the next step is to identify the specific groups whose membership is to be tested. These are the groups against which membership probabilities will be measured.

ICE needs two groups sensitive to the same variables. The easiest way to insure this commonality is to choose opposite sides of the same coin. For example, focusing on a single department helps insure that high and low performers really occupy opposite sides of the same continuum. The broader the area, the more likely it is that unrecognized factors will creep in. These factors can reduce the accuracy of the ICE analysis.

The earlier sales example can illustrate the potential consequences of this issue. If people selling to business owners (who tend toward the RS style) were mixed with those selling to OEM's (who tend toward the HA), ICE would "see" both of the two styles as important. ICE would then find the best breakpoint that captures the effect of both styles. The result would be some mixture of RS and HA which would likely be "okay" for both types of sales but ideal for neither. The professional Organizational Engineer would do well to remain alert for this type of misspecification.

Professional Organizational Engineers are just that—professional. The tools he or she commands does not distinguish the professional from the amateur. Rather, it is the ability to apply the right tools at the right time in a specific situation in order to get a particular result. Everybody has a screwdriver but not everyone is an electrician. Similarly, the ability to define the problem correctly is one of the distinguishing marks of the professional Organizational Engineer.

TRAINING THE ALGORITHM

The ICE program is unique in that there are no formulas to figure out. Examples of people from each of two groups are simply input into a worksheet. The program builds its own internal formulas to figure out which factors are important. The organizational engineer can leave the math books on the shelf.

However, a key to the success of this strategy depends on choosing the right people as representatives of each group. The strength of the ICE formulas depends on the strength of the examples. Strong examples produce strong results.

The basis for putting people into one group or another does not have to be "objective." For example, an executive can subjectively select people for each group. No explanations are necessary. Simply run the program and the results will probably coincide with the executive's preferences—whatever their basis.

The problem is, of course, that the tool will only work for that person. If management changes, the ICE analysis will need to be rerun. This happens because the undefined preferences of the executive were imbedded in the formulas—new executive, new preferences, and a new ICE model.

Generally, objective measures provide a more stable basis on which to distinguish between groups. For example, sales people can be classified on basis of dollar volume, while R&D people might be measured by the number of patents granted. Objective measures can keep the ICE results relevant for longer periods. In addition, explaining the "why" of the choice becomes much easier.

However, personal judgments should not be dismissed. There are situations where this is the best method available. In general, functions and activities that have no clear standards for success usually require that a greater reliance be put on subjective measurement.

For example, staff functions typically do not carry clear measures of success. While a strategist can offer many options, there may be no way of judging whether any or all of them would be successful if applied in the world. Rather, the opinions of peers or superiors must be relied upon. Since there is no alternative, subjective judgment may be the best measurement available.

Regardless of the objective or subjective basis of their creation, ICE estimates should be reviewed regularly. Environments change over time and the success factors related to them can shift. For example, accident propensities of individuals working in a warehouse might be affected by changes in equipment. Since not all changes are as obvious, it is probably a good idea to periodically revisit the established ICE results.

An ICE analysis is best viewed as a "snapshot". As time passes, it is wise to take a new "snapshot" to insure reality always stays in focus.

RUNNING THE PROGRAM

An ICE program is included with this issue of the journal. It is written in Microsoft Excel 97/2000. Therefore, Excel must be installed on a system to use it.

Running the system is a simple two-step process. The first step involves inputting the training data that ICE will use to create the formula to address the issue. A copy of the program is then saved under another name so it can be used into the future.

The second step is application. When there is someone to evaluate, the saved program is retrieved. The data for that person is input and "run" is clicked. ICE instantly generates a probability that the person being evaluated falls into one or the other of the two defined groups.

The probability estimate is based on a normal curve. This means that there is always a chance that the person being evaluated could be a member of either group. This should help to remind the professional to use ICE only as a one input among several when evaluating people.

ICE is not designed to or intended to be a "switch" that opens doors or forecloses options for human beings. This process is best left to the human mind that can take into account subtle nuances, indirect indicators and undefined information. This kind of decision is not the realm of machines.

NON-DECISION USES FOR ICE

ICE is designed to assist in decision making. It requires minimal information, can be executed quickly and produces accurate results. It is an ideal support tool to extend the reach and contribution of an Organizational Engineering function within a firm or institution.

However, decision making does not define ICE's limit. As suggested by the case study, the tool can be used to extend understanding. In the case study, ICE was used to call management's attention to the previously unsuspected role of the Hypothetical Analyzer function. In other cases, the value of RS, RI or LP might arise as important factors.

This contribution to understanding might equal or exceed the value of ICE in decision making. For example, if a quality or combination of qualities is recognized as important, training programs might be designed and implemented to install the desired quality in people.

This training might be applied to a whole workforce to yield fast, wide scale benefits. Instead of waiting for new employees with the desired qualities to come along, existing employees might be re-trained to help them tap into those qualities that will make them successful.

ICE can also confirm judgments on the desirability of qualities. For example, if management believes quick, responsive behavior to be a success factor, then the Reactive Stimulator strategic style should be found in successful people. If it is not, then management may want to rethink its judgment in that area. This kind of result can easily lead to policy changes that effect entire organizations.

ICE is designed to be fast, easy and inexpensive. This means that it can be applied broadly and in service of many different kinds of goals.

For instance, in the area of safety, ICE might help identify strategic styles and demographic factors that appear to be involved in a disproportionate number of accidents. It is possible that the same qualities associated with accidents (e.g., speed of reaction) are also associated with high performance. Knowledge of this tradeoff might help a manager spur performance while reducing the risk of accidents.

For example, if a Reactive Stimulator strategy (instant action) were associated with a risk exposure, the trained Organizational Engineer would instantly recognize that training, in and of itself, is unlikely to produce an enduring result. This is because the RS typically has a short time horizon and is highly sensitive to passing environmental variables. It is likely that the training will not come to mind when it is needed most.

In this case, support mechanisms might be deployed to help the RS avoid tragedy. For example, checklists that must be signed before an activity can commence could build in a needed pause. Or a mechanical device that prevents certain actions (e.g., placing one's hand in a press) might prove a worthwhile investment.

If, however, the LP strategic style were found associated with a particular risk exposure, the professional engineer would know that training and instruction would probably be effective. Here, training could help circumvent the cost of mechanical devices and the productivity losses from filling out checklists. This is an example of the superiority of precision-response over the "one size fits all" model of the past.

SUMMARY

The ICE model is another tool for the professional Organizational Engineer's toolbox of solutions. It can represent a powerful instrument for materially contributing directly to organizational performance in a highly visible way.

The ICE model was developed to cover many situations that present themselves in the ordinary conduct of business. It does not, however, represent the limit of the technology. More variables can be accommodated and more than two categories can be differentiated. For example, co-author Soltysik has designed models that discriminate among a dozen medical conditions based on over 100 different variables.

It is not important that the professional Organizational Engineer know the mathematics needed to create these extended models. This can be commissioned from others—just as a professional architect commissions a structural engineer to design the supporting skeleton of the building he or she has designed.

What is important is that professional Organizational Engineers recognize that tools are available when they are needed. In this case, the power imbedded in the ICE model is available on command. It can help address issues previously out of reach and can be applied at volume levels that exceed manual capacities. This should serve to enhance recognition of Organizational Engineering as a contributor to the operational success a firm or other organization to which it is applied.

AUTHORS

Barbara J. Clugh is former Manger of Organizational Development for American Greetings, Inc., an international manufacturer of quality greeting and celebratory cards as well as other social expression products. She can currently be reached at her home office in Strongsville, OH at 440-572-5672.

Robert Soltysik is a consultant in mathematics and statistics who focuses on Organizational Engineering and Management Science issues. He can be reached at his home office in Valparaiso, IN at 219-462-6459.

Organizational Engineering Institute
101 Nickels Arcade
Ann Arbor, MI 48104

Phone: 734-662-0052
Fax: 734-662-0838
E-Mail: OEInstitute@aol.com

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