Technical Introduction to the TransferLogix™ Approach to Estimating ROI (Level 4/5 Evaluation)

Note: This document is designed for professionals who want an understanding of the research behind our approach to ROI. Those seeking a non-technical explanation should download the Overview instead of this document.

The evaluation of organizational impact from training and the associated return on investment (so-called Level 4) has long been the "holy grail" of training evaluation. Despite many decades of advocacy, surveys of practitioners continue to show that it is not often implemented in practice. Most likely this is because practitioners perceive it to be too difficult, expensive and time-consuming. Given the techniques that have been advocated, they are somewhat correct.

Largely overlooked has been a technique advocated for over 60 years by industrial-organizational psychologists called utility analysis. The list of researchers advocating utility analysis reads like a "Who's Who" of I/O psychology with Wayne Cascio and John Boudreau (2011) being the most current and well-known advocates. TransferLogix™ implements utility analysis in a practitioner friendly way to provide reasonable valid estimates of organizational impact and return on investment. The result is that every training program can estimate ROI with minimal additional effort.

Brief History of Utility Analysis

The history of utility analysis goes back to work done in the late 1940's by Hubert Brogden (Brogden, 1946, 1949; Brogden & Taylor, 1950). Lee Cronbach, the creator of the "Cronbach's alpha" correlation coefficient we all know so well, further refined the early methodology (Cronbach & Gleser, 1965). In fact, the early work done by Brogden-Cronbach-Gleser is still in use today.

The research foundation was further solidified by the renowned John Hunter and Frank Schmidt (Hunter & Schmidt, 1982; Hunter, Schmidt & Judiesch, 1990; Schmidt & Hunter, 1983; Schmidt, Hunter,McKenzie, & Muldrow, 1979; Schmidt, Hunter, & Pearlman, 1982). Hunter and Schmidt are best known for developing the meta-analysis methodology that is the standard for organizational research.

Wayne Cascio and John Boudreau have been most responsible for bringing utility analysis into the mainstream (Cascio, 1991; Casco & Boudreau, 2011). Dr. Cascio recently received the Michael R. Losey Human Resources Research Award from the Society for Human Resource Management in 2010. Dr. Boudreau is Professor and Research Director for the Center for Effective Organizations at USC's Marshall School of Business.

Of course numerous others have utilized utility analysis in their research throughout the years so this is not intended to be a complete list of researchers who have contributed to the elite status of utility analysis in the research literature.

In sum, utility analysis has become the gold-standard for analyzing the financial impact of human resources. It is generally accepted by the best research journals because it has such deep and well-researched roots that have demonstrated its validity. It is also a method that practitioners can "take to the bank" because the best minds in the business have built it.

Unfortunately it has not been adopted by practitioners, most likely because they mistakenly see the statistics involved as too complex. TransferLogix™ is breaking new ground by making this sophisticated technique accessible to every practitioner.

How Does Utility Analysis Work?

At the heart of the utility analysis equation are two critical measures:

1. the change in performance (skills or competencies) expressed in a standard deviation (SD) measure
2. the value to the organization of a one SD change in performance

Measure #1, the change in performance, is relatively easy to obtain and has never been the barrier to implementing utility analysis. In most research studies it is obtained by using a control group and comparing pre and post-test measures of performance between the groups. In practice control groups are often difficult to obtain.

An alternative is to use the pre and post-test measure for a single group (Schmidt, Hunter, Pearlman, 1982). If anything this approach is likely to result in a lower estimate of performance change and thus a more conservative estimate of ROI. The performance pre and post-test have been incorporated into TransferLogix™ for some time. Thus, the change in SD terms is thus easily be calculated by using the change in performance normed using the SD of the pre-test.

Utility analysis requires that performance change be expressed in standard units. To do this TransferLogix™ expresses the effect of training on performance in terms of the number of standard deviations (SD) by which trainee performance changed. This is estimated by calculating the difference between performance pre-test scores and the post-test evaluation scores of individuals who received training. The SD is a statistic that tells how tightly (or loosely) the-

Measure #2, the value of a one SD change in performance, has always been the primary barrier for practitioners to calculate ROI. Utility analysis offers several approaches to obtaining this value which have been demonstrated to offer valid estimates. The approaches we will implement are:

Salary Based Estimation – This approach (and the next) is where the real power of utility analysis is realized. As pointed out by Cascio & Ramos (1986), classic human capital economics states that over time the value of an employee to an organization will be approximately equal to the employee's total compensation. While variations will occur, over time if an employer over-pays for an employee they will be less profitable than other organizations, and if they under-pay their employees they will not be able to retain the talent they need. This principle, called the marginal revenue product (MRP) theory in labor economics (Becker, 1964; Cartter,1959), means that total compensation provides us a convenient starting point for estimating ROI. Furthermore, as Cascio & Ramos (1986) point out this approach has the added advantage of being a conservative estimate of ROI as it excludes the contribution of capital, materials and other intangibles that enhance the employee's value (Packer, 1983).

The extensive meta-analysis research conducted by Hunter and Schmidt (listed above) has shown that one SD of performance change is usually worth approximately 40% of the average total compensation of participants. This is derived from their meta-analyses which show that the average change in productivity for one SD change in performance is 20%. Furthermore, on average, knowledge and skills comprise approximately 50% of the economic value of goods and services. Thus, the economic value of 1 SD is, on average, 40% (.20/.50). It should be emphasized that these values have been derived from research, not seat-of-the-pants estimates.

In most cases the "40% rule" is a conservative estimate of ROI. However, in some cases the "40% rule" may overstate the ROI, and in other cases understate the ROI. TransferLogix™ provides advanced users the option of changing this percentage if they have the data to support it. In absence of such data, we encourage users to use the "40% rule" or use the next method discussed below.

Thus, simply by entering the average total compensation of training participants into TransferLogix™ a *conservative* ROI estimate can be produced. The simplifying assumption is that an employee's maximum value to the organization is his/her compensation. In many cases this understates the value so this approach can be viewed as a conservative estimate of ROI.

Percentile Performance Value Estimation – For positions which provide value to the organization greater than the person's salary, another easy method from the research will be offered. Hunter and Schmidt (1982) recognized that in many cases a person's contribution to the organization will exceed their total compensation. They developed the percentile estimation technique (called the global estimation procedure in the literature) to arrive at a more accurate value.

The percentile performance value approach simply requires that the organization estimate the value of a performer operating at the 85th percentile and the 15th percentile of performance. These two percentiles represent roughly plus and minus one standard deviations of performance. From these two estimates the distribution of performance value can be derived and the ROI estimate calculated.

Examples where this approach might be used could include sales persons, team leaders, managers, and similar positions in which there is a "multiplying" effect of improving performance such that the benefits can be greater than the person's compensation.

TransferLogix™ allows one person to make this estimate, or provide for electronic collection of multiple persons' estimates to improve the validity. Generally the multiple person approach is believed to be the best approach.

Calculating the Program Return and ROI

With the above information we then employ the standard utility analysis formula (Cascio & Boudreau, 2011; Schmidt, Hunter & Pearlman, 1982):

$\Delta U = (N)\ (T)\ (d_t)\ (SD_y) - C$

ΔU = gain to the organization in monetary units

N = number of employees trained

T = expected duration of benefits in the trained group expressed in years or portion of a year

d_t = the difference in performance between the pre and post-test in SD units

SD_y = the value of one standard deviation of performance change expressed in monetary units

C = total costs of the training program

The estimation of T, the duration of benefits from the training, is an important part of the equation. We advocate a conservative approach so as not to overstate ROI. The utility analysis equation is generally normed to one year because users want an annual ROI. Input values that are less than 12 months will results in T < 1, and inputs over 12 months will result in T > 1. We recommend estimating 12 months or less in most cases.

However, the above general formula implicitly assumes that the training program includes all of the behavioral objectives relevant to an employee's performance. In reality training programs often address only a portion of the behaviors relevant to a person's performance. In such cases the above formula would produce an inflated estimate of ROI without adjustment (Cascio & Boudreau, 2011, p. 294). Thus, following guidance from Cascio & Boudreau (2011) and Cascio & Ramos (1986) we include another factor P to adjust the ROI:

$\Delta U = (N)\ (T)\ (d_t)\ (SD_y)\ (P) - C$

P = the percentage of a person's performance affected by the training's behavioral objectives

Clearly the value of P can significantly affect the ROI estimate. We recommend that users err on the side of understating ROI by using conservative P estimates. Users should be careful to consider the full range of knowledge and skills required by a job and make realistic estimates of what percentage of those are covered by a single training program. In some cases P could be quite small (e.g. a one or two day training program), while in other cases P could be quite large (a managerial devel-

Summary

A major obstacle in the way of improving training systems and enhancing the stature of the training/human resource development function in organizations is the lack of practical methods for determining and demonstrating the strategic value of what we do. TransferLogix™ tackles this issue head-on by providing a straightforward, valid, and believable approach to estimating the dollar value of training programs. The training ROI information provided by TransferLogixTM can be used to assess the value of individual training events, track the value of training efforts over time, and compare the ROI across programs, units/departments, and participants.

Utility analysis has been seen sometimes as "too good to be true" but it really is a carefully researched and effective technique. While we would never argue that these estimates are better than a carefully conducted custom study, we (and others) do argue that the ROI metrics produced by utility analysis have a high level of validity. It is hard to argue with 60 years of research by some of the best organizational researchers and methodologists in the field!

Because they can be easily calculated for EVERY training program—which is not true of custom studies—they are a superior approach to making sound decisions about development interventions. Utility analysis estimates, especially those using the "40% rule" are easy to calculate and have been shown in the research literature to be remarkably accurate.

In short, it is an evidence-based approach that is "doable" by every organization for every training program. TransferLogix™ demystifies utility analysis so ROI can truly be the benchmark for every training program and become part of the daily lexicon for human resource development.

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