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**RETURN ON INVESTMENT: INVESTIGATING MANAGERIAL  
PREFERENCES FOR ALTERNATIVE RETURN ON INVESTMENT REPORTS**

A thesis  
submitted in partial fulfilment  
of the requirements for the degree  
of  
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by  
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## **Abstract**

Responses of 32 Officers and 1 Non Commissioned Officer, of the Royal New Zealand Navy, to three return on investment (ROI) training reports were investigated. The three report types were presented as a function of two ROI calculations: Critical Outcome Technique, and Utility Analysis - with Utility Analysis being used as the basis for two of the three reports. Participants were placed into one of three groups, each group consisted of 11 participants. Each participant group was presented with one of the three report types. Responses from participants were gained using a survey instrument for two constructs: perceived usefulness, and perceived understanding and clarity. The results of this study replicated the findings of previous studies in this area (i.e. Carson, Becker & Henderson, 1998; Macan & Foster, 2004). An analysis of quantitative data using Kruskal-Wallis statistical test failed to show significantly different perceptions of either perceived usefulness, or perceived understanding and clarity between the three groups. While the presented reports lacked high levels of support from participants, the findings of Latham and Whyte's study (1994) are brought further into question (i.e. Cronshaw, 1997; Macan & Foster, 2004) as utility analysis based reports did not negatively influence participants on the uptake of the hypothetical training initiative. Content analysis of the qualitative data, revealed a number of potential factors which may have caused a lack of significance between report type preferences. Most critically these causes may not be limited to this study alone, but may have implications for both previous and future studies into ROI acceptance.

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# CHAPTER 1

## Introduction

Training of groups and individuals has long been considered critical to building and improving performance, being frequently utilised by organisations to develop employees (Arthur, Bennett, Edens & Bell, 2003; Scaduto, Lindsay & Chiaburu, 2008). Training is an important and necessary investment in employees for a number of reasons, such as employees requiring additional knowledge or special skills to perform competently within roles (Brinkerhoff, 2005; Giangreco, Carugati, & Sebastiano, 2008). Training can also be required for progression within organisations; and even with good performers further performance gains can be attained through training (Steensma & Groeneveld, 2010).

Within military organisations, such as the Royal New Zealand Navy (RNZN), the organisation within which the present research was based, training is highly valued for its ability to forge desired behaviours within employees. As such, every person who joins the RNZN must complete an initial program of 'basic training'. The RNZN website reveals training activities which are currently being carried out, both standard training opportunities and more unique opportunities. For example, in late April 2011, the feature article on the site tells of a current training exercise, in which the RNZN hosted the command headquarters for a visiting US Navy Commodore upon the HMNZS Canterbury, enabling the Commodore to have strategic command from a RNZN vessel - an exercise which simulated the real world occurrence of transferring strategic command

from one command centre to another, in the event that the command vessel is unable to operate as the command centre.

As exhibited by the above examples, many different types of training initiatives are utilised by organisations and include: orientation of employees; apprenticeships; industry specific training; and training to ensure legislated requirements such as health and safety. These training topics can be delivered via a multitude of delivery methods, including: coaching and mentoring; classroom instruction; e-learning and web based delivery; and on the job training. From these two primary aspects of training: what to train and how to deliver the training, a number of questions arise around such issues as what skills should we seek to instil in our workforce through training? How should we deliver that training? And how do we know the training has had the desired effect? Is there a better way? These questions can only be answered through an evaluation of the training program to ensure its utility (Giangreco et al. 2008). Understanding how to present this information in an understandable and meaningful way is critical to informing organisational decision makers. The question of how best to deliver this critical information was the focus of the present research, specifically understanding informational preferences of decision makers within the RNZN.

### **Kirkpatrick's Four Levels of Training Evaluation**

When reviewing training evaluation methods, Kirkpatrick's Four Levels of Training Evaluation (1994) is often discussed as a staple of training evaluation (Giangreco et al. 2008; Hamtini, 2008; Smidt, Balandin, Sifafoos, & Reed, 2009), providing a useful hierarchy of training evaluation, to guide both experienced

practitioners and novices alike in training evaluation. The hierarchy of training evaluation is based on a continuum starting from no identification of increased individual/team/organisational performance resulting from the training intervention, to identification of increased individual/team/organisational performance from the training intervention:

1. Reaction
2. Learning
3. Behaviour
4. Results

**Reaction.** The first level of Kirkpatrick's evaluation hierarchy is both the most commonly applied and the weakest of the four levels in the hierarchy. Reaction level evaluation questions how training recipients rate the training and/or training experience. Rating of the training is typically accomplished through surveys, often referred to as 'Happy' or 'Smile' sheets, as generally the survey requests that the participants provide feedback as to whether they enjoyed the training program/event or otherwise.

**Learning.** Evaluation of learning is accomplished by measuring the increased knowledge base specific to the training program, which the trainee has gained from the training. Measurement of learning typically involves comparison of measures taken prior to the training and measures taken following the training. An example of this kind of measure in the RNZN might include riflemen training, in which the rifleman is tested via a pen and paper test on the rules of engagement (rules of engagement within a military context, state when, where and how force is to be used against an opposing force).

**Behaviour.** Evaluation at the behavioural stage involves evaluating the application of learning within the job – essentially the individual’s ability to apply the learned knowledge, skills or behaviour in the work environment following the training (Baldwin & Ford, 1988, p.63). The evaluation is achieved through observation or interviews over time to assess change, and also assess sustainability of change. An example of behavioural evaluation within an RNZN context, building on the riflemen example, would occur when the riflemen’s accuracy score is recorded prior to weapons training, these scores are then compared to their accuracy score following the completion of weapons training, potentially on a simulated ‘live fire’ exercise. With the change in scores demonstrating that they have applied their taught behaviours have been applied to a simulated ‘real encounter’ environment.

**Results.** The results level evaluation seeks to evaluate the impact of improved performance resulting from training on organisational results. This level of the evaluation typically utilises existing organisational data, to identify changes in organisational performance which can be attributed to the increased performance of the trainee(s). This level is the most powerful of Kirkpatrick’s four levels, as it seeks to evaluate the impact of the training on key performance indicators (KPI). An example of this level of evaluation within the RNZN might include a leadership training program in which officer cadets are taught leadership strategies. Following the training program, completed missions (KPI) or ‘real encounter’ leadership simulations would be evaluated to see how leadership was applied to progress and successfully complete the mission.

**Summary of Kirkpatrick’s four levels.** Kirkpatrick’s hierarchy is very useful in guiding and assisting the evaluation of training. When needing to compare training

programs, Kirkpatrick's hierarchy can provide excellent information, which can be used to compare different training programs, thus informing the decision of which to keep and which to discontinue. For example, if two training programs were piloted, an evaluation completed using the levels prescribed by Kirkpatrick's hierarchy would provide information to allow for a comparison.

However, training like all other organisational investments, will often need to compete for budget allocation, and this is where Kirkpatrick's approach does not provide organisational stakeholders and decision makers with the information that they require. What is required in these situations is the ability to compare training with, for example, the purchase of new manufacturing equipment and the financial returns that this new equipment would provide. In this situation, how could decision makers compare two very different investments?

### **The Fifth Level**

'Return on investment' (ROI), sometimes referred to as the fifth level of training evaluation (Phillips, 1996), takes the next step from Kirkpatrick's four levels of evaluation, allowing organisations to calculate an estimate of monetary value to be gained from utilising the training intervention (e.g. Cascio, 1991; Hazer & Highhouse, 1997; Schmidt, Hunter, & Pearlman, 1982). A critical advantage of ROI evaluations over methodologies such as Kirkpatrick's is that they can often be utilised before any training is actually undertaken.

The ability to evaluate spending within the area of human resources, particularly in training interventions, is vital for the continued success of an organisation (Cascio &

Boudreau, 2008; Russ-Eft & Preskill, 2005; Wright, Gardner, Moynihan, & Allan, 2005). Not only can ROI calculations assist with the selection of training interventions within an organisation, but at the wider organisational level decision makers are able to weigh up the advantages and disadvantages of each investment proposal. For example, investment proposals from human resources can be compared with those from marketing or manufacturing, comparing the forecasted returns from the range of interventions and investments available to an organisation (Cascio, 1991; Mattson, 2003; McLinden, 1995; Phillips & Phillips, 2005; Zenger & Hargis, 1982). The ability to compare investments is also critical within a military context. Questions such as ‘should we invest in new equipment, or should we invest in training our people to use the current equipment differently?’ are asked within such organisations as the RNZN, questions which can be greatly informed through the use of an ROI evaluation.

The key argument of ROI, is simply that organisational funds directed into human resource activities must be treated as an investment, and be continued or discontinued on the merit of their predicted/actual financial benefit (Cascio, 1991; Lyau & Pucel, 1995; Russ-Eft & Preskill, 2005). The time has passed when training interventions could be selected merely because they appear fashionable or in vogue (Cascio, 1991; Phillips & Phillips, 2002; Phillips & Phillips, 2005).

In response to the continuing and ever present need for fiscal responsibility and ultimately fiscal success within the human resources environment (Winkler, König & Kleinmann, 2010), several methods of calculating ROI have been promoted by human resource scholars and practitioners (Mattson, 2000; Phillips & Phillips, 2002; Phillips & Phillips, 2005; Raju, Burke & Normand, 1990). While many formulas and calculations

fall under the umbrella of ROI, the present research utilised two training specific methods of calculating ROI: Utility Analysis (UA) and Critical Outcome Technique (COT) (Mattson, 2003). These two methods were chosen as both UA and COT were used in a study (Mattson, 2003) which the present research is an extension of. UA has received much attention within peer reviewed journals (Cabrera & Raju, 2001; Hazer & Highhouse, 1997; Macan & Foster, 2004; Latham & Whyte, 1994; Whyte & Latham, 1997; Winkler et al. 2010). While in comparison COT is representative of a method of estimating ROI which has been the subject of a number of practitioner orientated books (Phillips, 1994; Phillips & Phillips, 2002; Phillips & Phillips, 2005), as well as appearing in the academic literature (Mattson, 2003; Mattson, 2000). Prior to reviewing the specific research on these two methods, an outline of the methods is provided.

### **Utility Analysis Formula**

UA has been applied to a variety of human resource interventions, including such activities as training (e.g. Cascio, 1991; Hazer & Highhouse, 1997; Schmidt et al. 1982), personnel selection (e.g. Schmidt, Hunter, McKenzie, & Muldrow, 1979), and downsizing (Cascio, 1991). Each of these interventions/activities requires a slightly different calculation (Cascio, 1991). As the present research looked at the evaluation of a training intervention, the Brodgen-Cronbach-Gleser's Utility Analysis calculation was used, as this is specific to training evaluation:

$$\Delta U = (N)(T)(dt)(SDy) - C$$

where  $\Delta U$  is the financial gain to the organisation resulting from the training intervention;  $N$  is the number of employees who begin the training;  $T$  is the expected duration over



which the organisation will gain a performance increase from the trained group (for example, average expected tenure within the role can be used to determine this figure);  $dt$  is the difference in job performance between the untrained group and the trained group;  $SDy$  is the standard deviation of job performance of the cohort being trained expressed in dollar value; and  $C$  is the total cost to train  $N$  (number of) employees (Cascio, 1991).

**Methods of Calculating SDy.** While all other components of UA are widely accepted and relatively easy to comprehend,  $SDy$  remains, to an extent, the Achilles heel of the calculation (Cascio, 1991; Schmidt & Hunter, 1983; Schmidt, Hunter, McKenzie, & Muldrow, 1979; Weekley, Frank, O'Connor & Peters, 1985). Essentially,  $SDy$  is the estimation of the improved performance of an individual on a defined task following the training. Without  $SDy$ , the UA calculation is almost without merit, merely reduced to a cost calculation without any ability to predict return from the training investment. Historically,  $SDy$  was believed only to be able to be calculated from cost-accounting methods (Weekley et al. 1985). However, more recently three methods have gained acceptance, which replace the need for the time consuming and costly exercise of cost-accounting (Cascio, 1991; Schmidt et al. 1979). These three methods for calculating  $SDy$  can all be accomplished relatively easily and cost effectively, and have allowed UA to move forward in terms of ease of use, credibility, and validity (Cascio, 1991, p. 208).

***Global Estimation of the Dollar Value of Job Performance.*** The global estimation of the dollar value of job performance (Schmidt et al. 1979) (abbreviated to global estimation method in this thesis) involves asking a large number of supervisors who are knowledgeable about the role or role function, to provide an estimate of an average employee monetary value to the organisation (50<sup>th</sup> percentile), and the monetary

value of an above average employee to the organisation (85<sup>th</sup> percentile). These two estimates are then averaged across supervisors, with the resulting difference between the two averages being SDy (Hazer & Highhouse, 1997).

The global estimation method relies on a standard normal distribution curve of performance across the role/task, which is (potentially) receiving training. Discussions with the RNZN revealed that performance differences between role incumbents are seen as very small. This small difference is in part due to the excellence driven nature of the RNZN. Poor and average performing individuals are identified and measures put in place to ensure their performance is lifted, having the effect of creating a negatively skewed distribution of job performance – whereas this method relies on a standard normal distribution curve. Given the lack of variability in job performance, this method, while being useful in a number of applications, was not appropriate for use within the present research.

***Cascio-Ramos Estimate of Performance in Dollars.*** Cascio-Ramos estimate of SDy (Cascio & Ramos, 1986) (abbreviated to CREPID in this thesis) involves allocating the annual salary provided for the role, across the principal duties of the role. As an example, the principal roles of a Marine Engineer Officer include: managing engineering projects; equipment upgrades; equipment repair and maintenance. Each of the incumbents is then provided a performance rating on each principal duty, the performance ratings are then multiplied by the allocated portion of annual salary. When these results are summed across all job activities, the standard deviation of the summed values between role incumbents is then taken as SDy (Hazer & Highhouse, 1997).

CREPID relies on the assumption that the average wage equates to the economic value of the individual. As Boudreau (1988) points out, this assumption does not hold out in rank, tenure or hourly pay rate situations. For example, within the RNZN a subordinate officer is always paid less than the officer they report to, regardless of the skills the subordinate officer holds. This is very different from a private company that does not pay according to rank, for example often a very successful salesperson can through sales commission earn more than their manager – in this situation the individual is paid on the basis on their economic value to the organisation, rather than their rank. Given that the RNZN is a rank and tenure based compensation system, CREPID was not suitable for implementation within this study.

***The 40 Percent Rule.*** Schmidt and Hunter (1983) recommended that when time or resources do not allow for a more detailed calculation of SDy, 40% of average compensation for the target role can be used as an estimate of SDy. Average compensation is defined as all payments made to each of the job incumbents over a financial year, divided by the number of incumbents within the role. The use of 40% of average compensation was found to be comparable to estimates of SDy when utilising other methods of estimation, however the use of this figure provides for a much quicker and more efficient way of estimating SDy. The SDy figure when estimated through the Global Estimation method was found to range from 42% to 60% of average compensation (Schmidt & Hunter, 1983). The lower figure of 40% was suggested by Schmidt and Hunter to ensure that estimations were acceptable and believable when presented to organisational decision makers. While acceptability based on level of financial return from the training intervention has not been found to be significant

(Mattson, 2003), there is still reason to be cautious about ROI forecasts, as ROI calculations cannot take into account a range of factors which may affect the potential return. These factors may include changes in the market place; inability for incumbents to make use of the newly learnt skills; consumer demands – and a host of other real world ‘interruptions’ to organisations. The 40 Percent Rule, given its suitability for the present research, coupled with the research support it has received (Hazer & Highhouse, 1997), was selected to be used within the present research.

### **Critical Outcome Technique**

The Critical Outcome Technique is a more recent ROI calculation technique than UA, and was formed in reaction to four perceived problems and/or deficiencies within the area of human resource intervention evaluation (Mattson, 2000):

1. Human resource development (HRD) (i.e. training) program evaluation often requires experimental designs which are both complex and difficult to implement in the real world.
2. Increased utilisation of organisational resources are required to evaluate programs in the context of a complex system, and these resource investments are often larger than organisations wish to contribute to HRD evaluation programs.
3. Most evaluation models begin with the premise that the HRD program is causal in achieving the stated objective. Without an analysis of performance requirements, this premise is tenuous at best.

4. In light of UA presented above, the fourth and final claimed deficiencies is potentially contentious. Mattson (2000) proposed that the technique(s)/method(s) to carry out the human resource development program evaluation are missing from the current theoretical models currently in use, challenging the ability for these models to be used in a real world evaluation, and for the evaluations to be carried out in a fashion which is both efficient and reliable.

COT has been designed to answer these four issues with human resource development (HRD) intervention evaluation. COT is a five step post hoc procedure to determine financial return from a human resource training intervention (Mattson, 2000). The five steps consist of: outcome definition; outcome inquiry; outcome verification; outcome valuation; and outcome report. Each of these five steps is outlined below:

**Outcome definition.** While completing the outcome definition phase of COT, the evaluator defines the purpose of the HRD intervention. To define the purpose of the HRD intervention, the evaluator identifies sources of organisational information about the HRD intervention, e.g. training needs analysis, supervisors and managers, program sponsors etc, which may help provide the outcome definition. These sources of information are then utilised in the creation of an outcome definition statement or report. The outcome definition is also useful in determining whether the intervention is right for COT. Not all human resource interventions are created with measurable business results in mind. Often more general factors such as employee motivation, morale and team building are seen as the sole reasons for implementing the intervention – without a

linkage to measurable business results. The evaluation of interventions with no financially measurable results is outside the scope of COT.

**Outcome inquiry.** The outcome inquiry phase is where trained incumbents are questioned regarding their attainment of the intended outcomes (as defined in the outcome definition) (Mattson, 2000). Mattson suggested that a survey or test be used on the newly trained incumbents, to examine the new knowledge/behaviour of the trained incumbents (similar potentially to Kirkpatrick's (1994) Learning evaluation level).

**Outcome verification.** The outcome verification phase allows for input and comment from supervisors and management on the accuracy of reported perceptions of outcome attainment gathered during the outcome inquiry stage. Supervisors/management should be presented with a preliminary summary of the findings of the outcome inquiry survey, so that alterations/corrections can be made should they be required.

Supervisors/managers may make alterations/corrections to preliminary summary of the outcome inquiry, when current and historical data does not support the assertions made by role incumbents. For example, a sales person may make the comment that after the training program they are selling more, however based on year on year organisational trend data, the month after they finished the training may be typically a very good month due to external factors (i.e. end of financial year).

**Outcome valuation.** In the outcome valuation phase, supervisors/management are asked to place a financial value on the level of attainment of the defined outcomes. This stage can also be completed through the use of a survey, which requests supervisors/managers to place a financial value on the defined outcomes as attained by the trained incumbents. In his study, Mattson (2000) found that further discussion with

supervisors/management was sometimes required to determine a dollar figure when business results alone were indicated, e.g. 'a recent customer survey indicates customer satisfaction has risen 15% since the training intervention'. In this example the respondent would be asked what increased customer satisfaction is worth to the organisation. It is also at this phase that the cost of the HRD intervention is calculated. With these figures in hand, the benefits of the intervention are calculated by subtracting the program costs from the financial return attributed to the intervention.

**Outcome report.** The outcome report is the summary document of the COT evaluation, and should contain enough information for organisational decision makers to make a clear and well informed decision on the success or otherwise of the HRD intervention. Completion of the outcome report requires input from those in the organisation who will be the recipients of the report. Evaluators must take into account the information which recipients want covered in the report. By failing to determine what the organisation's needs are, the final COT report presented to the client organisation may be of little actual use.

### **A comparison of COT and UA**

The two approaches are very similar in that all variables, except the dollar benefit of training, can be calculated in the same way. The main differences between the two methods are:

- When they are applied, UA can be either pre or post hoc, while COT is post hoc only, as unlike UA it has no predictive ability.

- The method of determining the dollar benefit of training, UA utilises an experiment design in identifying the dollar benefit of training, while COT utilises subject matter experts.
- UA has a greater bias towards reporting the financial returns from the human resource intervention, while COT presents both financial and qualitative information regarding the human resource intervention within the report.

As presented above, both the tools (Mattson, 2000; Cascio, 1991; Phillips & Phillips, 2005; Hazer & Highhouse, 1997) and the need (Cascio, 1991; Phillips & Phillips, 2002) are present for both calculating and analysing the training ROI, however uptake by practitioners of these tools has not been widespread (Cabrera & Raju, 2001; Macan & Foster, 2004; Latham & Whyte, 1994; Whyte & Latham, 1997; Winkler et al. 2010). The research presented in this thesis is a continuation of decades of inquiry attempting to translate the measurable benefits of training interventions into a format which is readily accessible and recognised by organisational decision makers as valuable and relevant (Mattson, 2000; Phillips & Phillips, 2002; Phillips & Phillips, 2005; Raju, Burke & Normand, 1990).

Many previous studies have informed and influenced the present research, however the central study which has informed the present research was done by Mattson (2003). Mattson's study sought to understand how ROI evaluation reports were received and utilised by managers as a function of two factors:

1. Type of evaluation used
2. Reported financial impact of the training intervention



**Type of evaluation used.** Mattson presented three training evaluation reports: a UA based report, a COT based report, and an anecdotal report. These three reports were presented with the aim of gaining a greater understanding of which report is found to be most useful by organisational decision makers. While report styles/formats for both UA and COT are both present in the literature (Latham & Whyte, 1994; Mattson, 2000), Mattson was unable to find a definition which outlined an anecdotal evaluation report or approach. Mattson utilised the following definition, “An anecdotal report is one that has little or no basis in actual organizational data” (2003, p.134), rather it is the opinion of the report author(s). The investigation of the effect of alternative evaluation reports gave rise to Mattson’s first hypothesis, which states that managers will perceive the usefulness of the three report types differently (2003). Mattson found that report type did have a statistically significant effect on perceived usefulness of the information, as reported by managers within his study. To confirm which evaluation(s) was preferred, a pairwise comparison was completed between all three evaluation types. Both COT and UA were found to be significantly more useful than the anecdotal report; however there was no significant difference between COT and UA found within the study.

**Reported financial impact of the training intervention.** The reported financial impact of the training intervention refers specifically to the financial outcome of the training, as calculated through the evaluation. Researchers within this area have proposed that decision makers may be skeptical, when presented with what is viewed as an inflated predicted training ROI (Carson, Becker & Henderson, 1998; Mathieu & Leonard, 1987; Swanson & Mattson, 1997). Mattson used three financial impact levels to investigate this assertion about inflated predicted ROI figures, and manager’s

acceptance of ROI information. These three levels were gained through consultation with a small group of managers who were asked to provide their expectations as to a high, medium and low expected return from a training event, with the mean average of the groups' responses for each level being adopted as the percentage presented for the corresponding level within the financial impact condition of Mattson's study (2003). The highest financial impact level reported an expected ROI of 2,800%, while the medium level reported an expected ROI of 400%, and the final and lowest level reported an expected ROI of 116%. These three financial impact levels were used to test Mattson's second hypothesis which stated that manager's will have different perceptions of the usefulness of the reports, based on the financial impact levels used with the reports. Mattson's study did not support this hypothesis, as no significant difference in perceived usefulness was found between the three different financial impact levels used across the three report types.

Mattson's third and final proposal within the study, was that the two factors presented above, type of evaluation used and reported financial impact of the training intervention, may not operate in isolation from one another. Rather it was hypothesised that they were interdependent, for example a manager may find the preferred evaluation type not credible, due to an unbelievably high reported financial impact of the training, and vice-versa. This perceived interaction was not supported by the research findings, as no significant evaluation type x impact level interaction was found.

**Impact on the present research.** The findings from Mattson's study presented above, informed the present study in three key ways. Firstly from Mattson's findings, it was determined that further research using an anecdotal report type was not required, as

both COT and UA were found to be significantly more useful than an anecdotal report (hypothesis 1). Secondly, as no significant difference was found between the three presented financial impact levels, hence it was determined that this variable did not need further investigation within the present study (hypothesis 2). This decision not to further investigate impact levels was also informed by the knowledge that the sample size in the present research would not be as large as in previous studies (Hazer & Highhouse, 1997; Latham & Whyte, 1994; Mattson, 2003). Finally, the lack of significant interaction between evaluation type and impact level further confirmed the decision not to revisit impact levels within the current study (hypothesis 3).

Based on these findings, the original aim of the present research was to determine if the COT or UA method was significantly preferred by managers as a source of ROI information. This premise was built upon following the literature review, which is presented below, followed by refinement of the original research premise and presentation of the hypotheses of the present research.

### **The Utility Analysis Debate**

Throughout and prior to the present research, a debate was taking place within peer reviewed journals on the usefulness and acceptance of UA (Carson et al. 1998; Cronshaw, 1997; Hazer & Highhouse, 1997; Macan & Foster, 2004; Mattson, 2003; Whyte & Latham, 1997; Winkler et al. 2010). The debate centred on the acceptance of the UA calculation by practitioners/organisational stakeholders. The journal based debate was forced into the limelight by the article “The Futility of Utility Analysis” (Latham & Whyte, 1994). With a view to understanding the lack of interest/use by

managers of ROI calculations, specifically those calculating return from human resource interventions, Latham and Whyte (1994) sought to investigate if UA positively influences managers in deciding to invest in a selection system. The study was conducted with the assistance of 143 experienced managers, the majority of whom were enrolled in an executive Masters of Business Administration program at a North American university; none of the participants had any formal training with UA, validation procedures, or human resource accounting. The study sought to understand managers' informational preferences, and presented four information types/conditions:

1. An explanation by a psychologist of how standard validation techniques would be used to improve current selection procedures (this item (item one) was used as the control for the study)
2. The validation information from item one, plus a description of previous work done in the area of selection improvement, with the addition of an expectancy table outlining the probability that the psychologist's recommendations would increase the identification of good performers through the improved selection outcomes.
3. The validation information from item one, plus a description of utility analysis with an accompanying report predicting the financial outcome of the psychologist's work on improving selection outcomes.
4. The validation information from item one, the expectancy table information from item two, and the utility analysis information from item three.

The findings by Latham and Whyte's study portrayed a damning picture of UA.

The UA condition received the lowest preference scores of the four conditions presented,

and participants in the study were significantly less likely to use the UA condition (information type 3) in comparison to the control condition (information type 1). The lack of acceptance from participants of the UA condition led Latham and Whyte to conclude that utility analysis actually “succeeds in reducing managers’ commitment to and confidence in selection procedures” (1994, p. 40).

The research completed by Latham and Whyte (1994), while statistically significant in its lack of support for UA, was not conclusive, as shown by subsequent studies. No successful replication of Latham and Whyte’s findings has occurred to date (Carson et al. 1998; Macan & Foster, 2004). The lack of replication of the study has encouraged further research, which is summarised below.

A study by Hazer and Highhouse (1997) examined the elements of UA to determine which element may have contributed to its lack of use/acceptance by managers. As stated by Hazer and Highhouse, utility calculations are no more complicated than expanded benefit-minus-cost formulas. They proposed that through the investigation of individual UA components, a greater understanding of what is driving negative or positive perception of UA in managers could be gained. Hazer and Highhouse focused on three elements of UA: estimation method of SDy; framing of the return; and the human resource intervention being evaluated.

Hazer and Highhouse investigated these three components of UA through the distribution of a written scenario to 179 managers from a variety of organisations (including both public and private organisations). The written scenario consisted of a fictitious example, in which the organisation’s president needed to make a decision on the continuation or termination of a trial human resources program. The written scenario

consisted of a utility analysis evaluation of the program, which provided an analysis of the results from the program so far, with the remainder of the written scenario consisting of a conversation between a human resources representative and the organisation's president. The conversation provided an outline and explanation of UA.

As outlined earlier in this thesis, SDy has been the most contentious of the UA calculation components. Hazer and Highhouse sought to gain greater understanding of manager's acceptance of the method used to estimate SDy. To accomplish this, three SDy estimation methods were used within their research: Global estimation method; CREPID; and the 40% rule, (which were outlined earlier). Hazer and Highhouse predicted that CREPID, based on an earlier study which found managers perceived CREPID as more accurate than either the global estimation method or 40% method (Edwards, Frederick, & Burke, 1988), would be more perceived more favourably by managers than the 40% or global methods calculation of SDy.

However both this hypothesis and the null hypothesis were rejected, as the study revealed that participants found utility analysis most useful. Participants were more likely to use utility analysis, when the 40% method was used to estimate SDy and not CREPID as hypothesised.

This finding was of critical importance to the present research, as it brought into question the decision made within Mattson's (2003) study to use the global estimation method, when the 40% method could have been applied. This raises the question, would the results from Mattson's (2003) study have been more favourable to UA if the 40% method had been used? Mattson specifically states as the developer of COT, that to "...minimize experimenter bias, the format of the utility report for this study was based

on earlier studies...” (2003, p. 137), it would appear that this replication of a previous format has disadvantaged the presentation of UA within his study, as it has excluded the adoption of the 40% method for estimating SDy.

The framing of the return was the second component of UA which Hazer and Highhouse (1997) investigated. Framing within an UA report is about how the information is presented, specifically the ROI figure. Framing of the financial return on investment can be accomplished primarily in two ways. It can be presented as a cost of not completing the human resource intervention, or it can be presented as an additional gain from completing the human resource intervention. They hypothesised that presenting an ROI estimate as a cost from not acting, would be more favourably perceived by managers, over presenting the ROI estimate as a gain.

The findings in relation to this hypothesis were not straight forward, with results indicating that while participants who reported a strong understanding of utility analysis, the framing had little to no effect. For participants who reported a more moderate understanding of utility analysis, there was a slight preference for the analysis to be framed as a cost of not implementing the human resource intervention. While this finding was not as critical to the present research as their first finding, it is important for the present study. The reason for its importance is that it allows the decision for framing to be made in consideration of the client organisation. Potentially some organisations may prefer framing it as a cost of not completing the training program, while others may prefer framing it as a benefit of the training program. It is the assertion of the researcher that within a training culture, presenting ROI reports as an opportunity provides a more cohesive fit. This assertion is based on conversations with RNZN Senior Officers, and

researching RNZN materials. The RNZN is focused on improving training applications and is seeking opportunities to advance this goal, as evidenced by the invitation to conduct research on ROI calculations and provide a calculation for use within the RNZN.

The third and final element of ROI which was focused upon was that of the human resource intervention being analysed and presented. Hazer and Highhouse (1997) proposed that potentially UA might be perceived by managers as being acceptable to selection or specific human resource interventions, over and above other human resource interventions. To test this, Hazer and Highhouse (1997) presented two interventions: training and selection. Based on previous research (i.e. Hogan, Curphy, & Hogan, 1994) which suggested that traditional selection is not viewed by managers' as instrumental to organisational success, Hazer and Highhouse (1997) predicted that UA would be perceived by managers as being more acceptable when a training intervention is analysed, rather than a selection intervention. Hazer and Highhouse (1997) did not find any preference among participants for the type of human resource intervention (selection vs. training) analysed.

The lack of a statistically significant finding in relation to the human resource intervention hypothesis provided the ability to select a human resource intervention for hypothetical UA in conversation with RNZN Senior Officers. The consensus reached with RNZN stakeholders was that a hypothetical training example would be most salient and appropriate to the RNZN Officers which were to be presented to.

In a replication and extension of the research of Latham and Whyte's (1994) study, Carson et al (1998) used the same materials as Latham and Whyte, with a very similar population, but did not replicate the results reported by Latham and Whyte. The



extension of the Latham and Whyte study (1994) which Carson et al. (1998) included was to test the hypothesis that the presentation of the validity and utility analysis information was overly complex. SDy information which was deemed by the researchers as excessive was removed. While the removal of excessive SDy information did not significantly improve acceptance of the utility analysis calculation, the non-significant results did indicate the potential for an oversupply of SDy estimation information to reduce participant support of the ROI calculations.

While not finding high levels of support for UA, Carson et al. (1998) reported that they were at a loss as to why the earlier statistically significant results were not replicated. This lack of replication raises a multitude of questions, both of the validity of Latham and Whyte's study (1994), and of potential cultural differences between organisations and acceptance of ROI. As put forward by McCall and Kaplan (1990), organisational values are a source of information about what should be valued and what can be dismissed. While outside the scope of the present research, this raises the question: are all organisations capable of accepting ROI information? Most critically for the present study, it affirms that the findings by Latham and Whyte (1994) are not definitive, and further investigation into utility analysis and the wider body of ROI knowledge is warranted (Cronshaw, 1997).

The assertion by Carson et al (1998) that a lowering of the complexity of the utility calculation, through the reduction of SDy information, may have the potential to increase participant acceptance was an important query in the present study. The potential for an increased acceptance of UA by managers, through not only a reduction of SDy information, but coupled with a reduction in the perceived complexity of the calculation,

was also informed by Mattson's (2003) study. In his study both COT and UA received similar levels of overall acceptance. One of the potential advantages of COT over UA in this researcher's estimation is its ease of interpretation, while UA can be perceived as complex with its calculation centric approach. With this potential for increasing acceptance of UA, a third report was created which extended the simplification/reduction of SDy information, to all aspects of the calculation through presenting the utility calculation in plain English rather than as a formula driven calculation.

As an example, the third report type (referred to as Customised Utility Analysis (CUA) within this thesis), presented the SDy component of the calculation as follows:

"The dollar value of a unit of improvement. This is estimated by taking %40 of the annual salary of the position which the trainees are employed in. In this case the annual salary of Physical Training Instructors is \$40,000. Equating to a unit of improvement being valued at \$16,000."

This is compared to the explanation of the Standard Utility Analysis (SUA) written report of SDy:

"SD<sub>y</sub> is the Standard Deviation of Performance expressed in dollar terms. This is estimated by taking %40 of the annual salary of the position which the trainees are employed in. In this case the annual salary of Physical Training Instructors is \$40,000. Equating to an SDy of \$16,000."

While not a large change, the reduction of complexity through the removal of mathematical terms within the CUA report may have a positive impact on acceptance of that report, as suggested by previous research (Carson et al. 1998; Hazer & Highhouse, 1997; Mattson, 2003).

**UA Research Summary.** In summarising the UA research presented above, there are three key aspects which have informed the present research. Firstly, the lack of a successful replication of Latham and Whyte's (1994) study (i.e. Carson et al. 1998; Cronshaw, 1997; Macan & Foster, 2004), indicate that the application and presentation of UA is more complex than first thought, and further investigation is warranted. Secondly, acceptance of UA by managers is tempered by how SDy is calculated (Hazer & Highhouse, 1997), a critical component that was overlooked within Mattson's (2003) research. Thirdly, the complexity of information presented, may have an effect on managers acceptance of UA (Carson et al. 1998; Hazer & Highhouse, 1997).

### **Critical Outcome Technique Research**

Research on COT has been limited. Perhaps due to its emphasis on practitioners, the majority of literature on COT has appeared as summaries of how the procedure (and its variants) were used in specific organisations (Mattson, 2000; Phillips, 1994; Phillips & Phillips, 2002; Phillips & Phillips, 2005), or was presented in practitioner seminars. A important study for the current research, was Mattson's (2003) which was covered earlier in the thesis.

### **The Present Study**

The present study was guided by three drivers. Firstly the RNZN expressed a need to have an introduction to different methods of estimating return on training investment, for the purposes of selecting a method for implementation within that organisation. This requirement was met through introducing two calculation methods, UA and COT, with three different report types being presented to the RNZN: COT, SUA and CUA.

Secondly, the literature review revealed mixed findings for UA acceptance, prompting further investigation into how ROI is presented to organisational decision makers – specifically the presentation of training ROI. The present research aimed to meet this requirement through building on previous research in order to gain a better understanding of UA acceptance amongst managers.

Thirdly, the body of research on UA has provided specific and statistically significant findings, which when pieced together outline a ‘best practice’ approach to presenting UA to managers, however aspects of this ‘best practice’ approach have not been utilised in the research that followed these findings. Specifically, Mattson’s research, which did not take into account the use of the 40% method of calculating SDy, which reduces complexity within the SDy explanation and wider UA calculation (Hazer & Highhouse, 1997).

**Research Hypotheses.** The resulting hypotheses were: Hypothesis 1 (H1): Customised Utility Analysis will be rated significantly higher than either Critical Outcome Technique or Standard Utility Analysis, in terms of perceived usefulness. The rationale for H1 is based the identified gap within Mattson’s research, within which as identified earlier, UA was not presented in accordance with previous statistically significant research findings on the presentation and acceptability of SDy calculations. Specifically, the 40% Rule was found to increase acceptance by managers (Hazer & Highhouse, 1997), yet this method was not used within Mattson’s research. Building on this gap, and taking into account the assertion by Carson et al. (1998) that a reduction in the perceived complexity of the report may lead to increased acceptance of UA by managers. Then a reduction in both the presented complexity of calculating SDy and

complexity across the report, then CUA should be rated by managers as significantly higher usability than either COT or SUA.

Hypothesis 2 (H2): Customised Utility Analysis will be rated as being significantly more acceptable in terms of perceived complexity than either Critical Outcome Technique or Standard Utility Analysis.

As identified in H1, the reduction of complexity is predicted to increase managers acceptability of CUA, through removing the statistical terms used within UA and replacing these with common language terms. H2 supports this hypothesis, through the expectation that CUA will be rated as significantly more acceptable in terms of perceived complexity. The reduction in perceived complexity will be achieved through calculating SDy through the 40% Rule, and by presenting the calculation in plain English, rather than a mathematical calculation.

## CHAPTER 2

### Method

#### Organisational Context

A key component of Royal New Zealand Navy (RNZN) culture is accountability, with accountability for Government funding being no exception. This culture is reflected in artefacts such as the RNZN Business Excellence Model (internal memo, 25 November 2003), which states the general requirement for a return on investment calculation for use within the RNZN. As an organisation, the RNZN has had experience with return on investment calculations within human resource interventions. In a published example (Phillips & Phillips, 2002), a project was initiated within the RNZN which saw the use of a retention bonus scheme for RNZN Marine Engineers. Analysis of the outcomes included the use of a return on investment (ROI) calculation, which showed a positive return of 43% on the retention scheme investment.

A culture of accountability, a positive experience with ROI (Phillips & Phillips, 2002), and a requirement for the adoption of a ROI calculation, coupled with the fact that at any one time 1/3 of all RNZN personnel are in training (either as training recipients or trainers), created the opportunity for this research to take place within the RNZN. The realisation of this research taking place in the RNZN was a result of the foresight of key RNZN personnel located within the RNZN Training School, who saw the opportunity for a ROI calculation being of high value within the RNZN Training School environment.

## **Participants**

A convenience sample was formed through RNZN Training school personnel initially identifying potential participants who have an interest in training, which may extend to the topic of calculating return on training investment – potential participants were identified from such areas as the RNZN Training School, Human Resources, and the wider population of Officers at RNZN Base Devonport. The potential participants were sent an internal RNZN email, in which they were informed about the research and invited to participate in it. Participants identified themselves by responding positively to the email, with a complete list of those who responded positively being forwarded to the researcher to enable direct communication between the researcher and participants. Due to the invitation being completed via internal email, neither the total number nor the demographics of potential participants invited were made available to the researcher. Resulting from the invitation, 33 personnel from the RNZN agreed to participate in the research. There were 6 (18%) female and 27 (82%) male participants. On a percentage basis, the sample closely mirrored the RNZN officer population by gender (20% female and 80% male officers across the RNZN; RNZN Monthly Personnel Report, June 2006). The research sample was made up of 32 Officers and one Non-Commissioned Officer. The participants' ages ranged from 21 to 51 years. The mean age of the sample was 36.6 years. Years of experience within the RNZN ranged from 1-30, with a mean number of years of employment in the RNZN of 12.1, which was slightly higher than reported length of service for total RNZN personnel of 8.6 years (however this figures does include both officers and enlisted personnel).

## **Study Design**

A between-subjects research design was used, which utilised a convenience sample, with participants being randomly allocated to one of three ROI report/method conditions. Participants were randomly assigned to one of three groups of 11 participants, with an email being sent to each of the participants to both inform and seek agreement on the time at which they would be participating in the research. All 33 participants who initially agreed to take part confirmed their acceptance to the specified time. Several participants did identify that they were unable to attend the specific session time which they had been assigned, in response to this they were offered the choice of the two alternative times. The decision as to which alternative time suited participants was left to the individual participants. Through chance, the three research groups comprised 11 participants each. Up to this point, the groups had not been assigned to a condition; the conditions were assigned to the groups on the morning of the research presentations.

Each group received a presentation on one of the following ROI methods: Critical Outcome Technique (COT); Standard Utility Analysis (SUA); and Customised Utility Analysis (CUA), with each presentation cumulating in a written report which was provided to participants during the presentation. In combination with receiving the written report, participants also received the decision making survey – the instrument through which the participants perceptions of the presented ROI method were gained. The report was the main focus of the decision making survey which was completed by the participants at the end of the presentation.



Each presentation followed the same format of a verbal presentation to participants (Microsoft PowerPoint slides and speaker notes are attached for each group, appendix A through F), which outlined the following aspects:

1. Ethical approval and overview of research project
2. Overview of research project
3. Description of the specific ROI technique
4. Hypothetical decision making scenario
5. ROI Report
6. Decision making survey

**Ethical approval and overview of research project.** Research participants were informed that ethical approval for this research project was granted prior to the commencement of this project, by the Department of Psychology Research and Ethics Committee, University of Waikato. The research design and materials were created with the support of, and in consultation with, Senior Officers of the Training School RNZN Base Devonport, Auckland. Participants were also informed that their participation was voluntary, and they could decide to end their participation at any time, without need of explanation – no participants left before the end of the presentations, and all decision making surveys were completed.

**Overview of research project.** Participants were informed that the research was designed to gain an understanding of managers' informational requirements of ROI reports, and preference for ROI calculation used. It was also explained that the responses they provided via the decision making survey would be compared to the two other groups of participants, to determine the informational and ROI method preferences of managers,

specifically RNZN Officers. Participants were informed that the outcome of the research may potentially inform the use of a ROI calculation and report for training evaluation within the RNZN context.

**Description of the specific ROI technique.** Participants were made aware that they were being presented with only one ROI method, which differed from the methods presented to colleagues within the other two research groups. Within the presentations, no references were made to different approaches of calculating ROI, and the ROI method specific to each presentation was presented in isolation. Participants who had an interest in understanding the other presented methods of ROI were invited to contact the researcher via email following the presentations, and information on the other ROI methods would be provided. Two individuals (6% of participants) took up this invitation, with speaker notes and presentation material being emailed to them on the two ROI methods which they had not been introduced to.

**Hypothetical decision making scenario.** Each of the three methods was presented as a report on a hypothetical training intervention by the Australian Institute of Sport (AIS). The training intervention focused on improving the ability of ten RNZN Physical Training Instructors to deliver physical training programs through enhanced time management, with the goal of ensuring the physical readiness of RNZN personnel. The hypothetical reports focused on outcomes such as: increased participation in team sports, employee retention, and improved fitness levels of service personnel. Each report contained a summary of the training intervention, with a calculation of return on training investment. All three reports supported the training program, and showed positive return on investment resulting from RNZN personnel participation. To ensure impartiality, the

three reports were presented to the researchers' supervisors prior to their use, with each being judged by the supervisors as being presented with equal favourability and ease of understanding (to the degree that each method allowed). The decision to have external judgement of the reports prior to their use stems from a previous study into utility analysis being criticised for not addressing the researchers known bias against UA (Cronshaw, 1997). The three reports are outlined below.

**ROI report.** The following section outlines the three ROI reports which were used within the research.

***Critical outcome technique report overview.*** Standardisation of the COT report has been achieved through the publication of guidelines (Mattson, 2000; Swanson and Mattson 1997). The COT report which was used in this research followed that prescribed format. The report began by introducing the 2006 AIS Short Stay training program as a success, as rated by the attending RNZN Physical Training Instructors. An overview of the goal of the program in relation to the RNZN was provided. A summary of business results that were attributed to the training received during the program was provided.

The attributed business result areas were:

- Increased RNZN personnel participation in team sports
- RNZN personnel retention
- RNZN personnel fitness improvement.

The identification of these three key business result areas was followed by a summary of the calculation outcomes, demonstrating positive return on training investment. The second page of the two page report gave a detailed analysis of the

calculation, including the individual aspects of the three business result areas identified above (Appendix G).

*Utility analysis report overview.* Unlike COT, no standardised report format has been published for Utility Analysis reporting (Mattson, 2003). To counter this lack of standardisation, the Utility Analysis Report style used by Mattson (2003) was adopted as a guide to layout and content of both the Standard Utility Analysis and the Customised Utility Analysis reports.

*Standard utility analysis report.* The report began by identifying that, as evaluated by the training participants, the AIS Short Stay training program was successful. The goal of the program was identified, and the analysis was introduced. The return on investment analysis was outlined as taking into account the following five key aspects:

1. Number of employees trained
2. Estimated duration of the training effect
3. Difference in job performance following training
4. Dollar value of increased job performance
5. Total cost of the training program.

The summary results of the analysis were presented, showing a positive return on training investment (Appendix H). The second and final page of the report provided a detailed overview of the calculation, including the utility analysis formula (a detailed outline of the formula is presented in Chapter 1).

*Customised utility analysis report.* The first page of this two page report (Appendix I) provided the same information as the standard utility analysis report, with very similar presentation of information. The difference between this report and the

Standardised Utility Analysis Report was the second page, which provided an overview of the calculation. Unlike the previous report, this report did not present a formula centric analysis; rather the calculation is devoid of mathematical symbols and instead relies instead on describing the calculation. For example, where the Standardised Utility Analysis Report presented SDy as ‘40% of annual salary of the position’, the Customised Utility Analysis Report simply presented this aspect of the calculation as “The dollar value of a unit of improvement. This was estimated by taking 40% of the annual salary of the position which the trainees were employed in. This case the annual salary of Physical Training Instructors was \$40,000. Equating to a unit of improvement being valued at \$16,000”.

**Decision making scenario.** To form a basis for the ROI calculations, a hypothetical scenario was created (Appendix J). This scenario situated the participant as the Commanding Officer of RNZN Training School, who was tasked with reading the ROI report, and considering what action they would take based on the report. Typical actions following the receipt of an ROI report might include: determining the success or failure of the training course; using the report to justify the continuation or discontinuation of the course to senior managers. The thought processes which a Commanding Officer, or senior manager, may undertake in determining their course of action following the receipt of a ROI report were examined through the decision making survey, outlined below.

**Measures.** The Decision Making Survey used within this research replicated and extended the survey measure which Mattson (2003) designed and used. The adapted survey (Appendix K) contains 27 questions in total, comprising 26 rating scale questions,

and one open ended question, structured across four sections within the survey. Each section is described below.

***Demographic information.*** The first section within the survey comprised 13 questions and was designed to provide information on demographics of the participant, and experience of the participant. The demographic questions asked were:

- a. Gender
- b. Age
- c. Current status with the RNZN (Officer or civilian)
- d. Total years of employment within the RNZN
- e. Years of experience as a trainer
- f. Years of experience as a Psychologist
- g. Years of experience in Human Resources
- h. Years of experience in Finance

Questions e. through h. provide useful information on participant group membership, for example if a participant group that supported an ROI report was found to all have extensive experience in Human Resources, then this may limit the ability of the findings to be generalised to a wider audience.

***Perceived usefulness of ROI report.*** As mentioned above, the survey was adapted from Mattson's (2003) instrument, with the second section of the survey containing the first construct, perceived usefulness of the report, formed from 11 items. Each item was answered via a five point anchored Likert scale, ranging from strongly disagree (1), to strongly agree (5). These items were designed to ascertain the participants' perceptions of the usefulness of the information and their intention to use the information contained

in the return on training investment report. The 11 items were designed to gain information on six key issues, which when totalled provided an overall perceived usefulness score. The six issues were:

1. participant commitment to implementing the training program
2. participant belief that the training program would generate similar results in their organisation
3. participant ability to justify to others their decision to implement the program based on the information provided
4. perceived trustworthiness of the report
5. perceived faith in the information contained in the report
6. participant confidence in the results which the report describes

The internal reliability coefficient (Cronbach's alpha) for the Perceived Usefulness scale was 0.93.

***Understanding and clarity of ROI report.*** The second construct, understanding and clarity, contained two questions, and was adopted from Mattson's (2003) Decision Making Survey instrument. This construct sought to measure the participants understanding and perception of the information contained within the return on training investment report. The two items within this construct were:

1. how understandable the report information was
2. how complex the formula used to give the return on training investment was

The internal reliability coefficient (Cronbach's alpha) for the understanding and clarity scale was .87.

***Additional information.*** The survey closed with an open-ended question, simply asking for any additional comments which participants may have. This question was purposefully unstructured, providing opportunity for participants to comment on any aspect of the research or presentation.

## **Data Analysis**

As a convenience sample was used within this research, the ordinal data gained from ‘Perceived usefulness’ and ‘Understanding and Clarity’ was analysed using non-parametric statistics. Specifically a Kruskal-Wallis one-way analysis of variance test was used to determine if group differences exist between the three independent groups. Following the Kruskal-Wallis analysis, should statistical significance be found, pair-wise comparisons were to be used to determine which group(s) were different.

In addition to the quantitative data gained, the final question of the decision making instrument survey was an open ended question, designed to gain qualitative information. This qualitative information was analysed using the Fleiss-Kappa statistical measure (Fleiss, 1971). Fleiss-Kappa is used for determining inter-rater agreement between a constant number of raters greater than two (if two raters are used, then Cohen’s Kappa is the appropriate statistic (Cohen, 1968)), when assigning items to nominal scales. The creation of a nominal scale was most appropriate for this analysis, as the themes did not form any ordered or hierarchical structure, rather the themes were simply labels to enable categorisation. To form the nominal scale, two colleagues of the researcher volunteered to read through the participants (both colleagues were social science students in the final year of their Bachelor’s degree), and through discussion



reach agreement on labels for the themes. Cohen's Kappa was not performed on the level of agreement between the two colleagues who formed the themes, as both expressed their agreement across the themes and definitions to the researcher without reservation.

To assign each of the comments received from participants to the themes/categories, three associates of the researcher volunteered to assist as raters. The three raters all have PhD's in science disciplines. The three raters were provided an outline of the research (Appendix L), the themes and their definitions, a Microsoft Excel spreadsheet containing the 29 received comments (the additional comments section of the decision making survey was optional, as such four participants decided not to make an entry into that section of the survey), an outline of Fleiss-Kappa, and instructions for completing the exercise. In the first stage of analysis, the raters were asked to individually assign the comments to one of the themes, and to return these to the researcher. The completed spreadsheets were then compiled into one master spreadsheet, with the three raters being brought together to discuss their assignment of comments to themes. The group discussion that took place provided an opportunity for the three raters to discuss the allocations of comments to themes as a group, and to ask the researcher questions if required. The role that the researcher took in these conversations was that of a facilitator, encouraging group discussion. The themes themselves were not questioned, as all three raters agreed that the presented themes/categories were present and useful in this analysis – with no additional themes being put forward by the three raters. The two sets of resulting Fleiss-Kappa statistics are presented in Chapter 3, along with an overall ranking of the nominal scales/categories as calculated through scale/category frequency of allocation.

## CHAPTER 3

### Results

This chapter provides a detailed analysis of both the quantitative and qualitative data gathered through the decision making survey. As outlined in Chapter 2, two non-parametric statistical tests were selected for analysis of quantitative data: the Kruskal-Wallis test to determine statistical significance, and pair-wise analysis to determine which of the three participant group(s) were significantly different. Content analysis was performed on the qualitative data to determine comment themes, with the Fleiss Kappa statistical measure used to determine inter-rater agreement on the assignment of comments to themes.

### Hypothesis Testing

As presented in the preceding chapter, perceived usefulness, understanding and clarity were assessed using a five point anchored Likert scale, adopted from Mattson's (2003) study. The points assigned to each scale item (i.e. Strongly agree = 5), were summed to provide initial return on investment (ROI) report preference indicators, such as mean scores for each report type, and standard deviation as a measure of variation from the mean within each report type group. These initial preference indicators along with statistical analysis are presented below for both perceived usefulness and perceived complexity.

**Perceived understanding and clarity.** Internal reliability coefficients (Cronbach's alpha) calculated in Chapter 2, demonstrates that the individual question items for both perceived usefulness and perceived understanding and clarity, have high commonalities

and interrelatedness. Table 1 presents the means and standard deviations for responses to both the perceived usefulness scale, and the perceived understanding and clarity for the three report types.

Table 1. Mean Scores and Standard Deviations for each report type

Report Type	Perceived Usefulness		Perceived Understanding and Clarity	
	Mean	(SD)	Mean	(SD)
Standard Utility Analysis	34.82	(5.44)	8.00	(1.73)
Customised Utility Analysis	37.27	(5.52)	7.55	(1.04)
Critical Outcome Technique	34.55	(7.66)	8.00	(0.77)

The slight differences between means (Table 1), were shown through the Kruskal-Wallis test, to have no statistically significant difference between report types for either perceived usefulness or perceived understanding and clarity. The Kruskal-Wallis test returned H-statistic (tie-corrected) values of 1.23 and 1.41 for perceived usefulness, and perceived understanding and clarity respectively.

An additional Kruskal-Wallis test was performed on the individual items to determine if there were significant differences between reports at the individual item level. Any statistically significant differences within the individual questions may inform future research in this area. No statistical significance was found when repeating the Kruskal-Wallis for each individual items used within the two factors of perceived usefulness and perceived understanding and clarity.

In summary, the above analysis failed to show any difference between perceived usefulness or perceived understanding and clarity, between the three report types, or between individual responses provided in the decision making survey.

### **Qualitative Results**

The final question in the decision making survey asked participants for any additional comments they would like to make. Initial analysis of comments by the researcher, revealed that five themes were present across the comments. The presence of themes was confirmed by two colleagues of the researcher, who after volunteering to assign themes/categories and accompanying definitions came to the decision that there were five distinct themes/categories as outlined in Table 2.

Table 2. Themes/Categories

Theme/category	Definition
Issues with the report content	This category is for those comments which identify the participant had some reservations, questions or concerns with the report content.
Situational considerations	The category is for those comments which identify the participant as having some reservations, questions or concerns with how the return on training investment calculation/report would be used/implemented within the RNZN.
Further information required	This category is for those comments which identify the participant as requiring further information, or

	clarification of aspects of the report or return on training investment calculation.
Issues with the ROI equation or method	This category is for those comments which identify the participant as having some reservations, questions or concerns with the return on training investment calculation or method.
Support for the ROI process/model	This category is for those comments within which the participant provides positive support for the return on training investment calculation or method.

Following the formation of these five themes, a second group of three coders volunteered to individually allocate each of the responses to one of the five themes. Due to the lack of statistically significant difference between the three report types, all the comments were pooled, hence the allocation of comments to themes should be read as overall themes on the three ROI reports presented – not as an allocation of comments to themes on one particular ROI report. Table 3 presents a tally of comments placed into the five themes/categories, containing both the allocation of comments to themes/categories both prior to, and following the group discussion. In Table 3, the figures within the two columns titled ‘n’ represent actual numbers of comments which were assigned to this theme, while the figures within the two columns titled ‘%’ are the percentage of comments allocated to this theme. For example, following the group discussion, 30 (34.5%) comments were allocated to the theme of ‘Further information required’.

Table 3. Allocation of comments to themes/categories

Theme/category	Prior to group discussion		Following group discussion	
	n	%	n	%
Further information required	26	29.9	30	34.5
Issues with the ROI equation or method	23	26.4	24	27.6
Issues with the report content	15	17.2	14	16.1
Situational considerations	12	13.8	9	10.3
Support for the ROI process/method	11	12.6	10	11.5

(n=87: four participants did not enter comments in this section of the survey)

Following this grouping, two sets of Fleiss-Kappa statistical analyses (represented as k) were completed, one set for the allocations by the three raters prior to discussion, and one set for the post group discussion comment allocation (Table 4). An interpretation of Fleiss Kappa, based on the Kappa interpretation table presented by Landis and Koch (1977), has been included within the table.

Table 4. Fleiss-Kappa: Pre and post-discussion of comment allocation to themes/categories

Theme/category	Pre group discussion	Post group discussion
	k	k
Further information required	0.23 Fair agreement	0.54 Moderate agreement
Issues with the ROI equation or method	0.29 Fair agreement	0.65 Substantial agreement
Issues with the report content	0.19 Slight agreement	0.40 Fair agreement
Situational considerations	0.03 Poor agreement	0.38 Fair agreement
Support for the ROI process/method	0.37 Fair agreement	0.66 Substantial agreement

Having confirmed medium to high levels of agreement (as defined by Landis & Koch, 1977) across the five themes, an interpretation of the meaning of comment allocation to themes is presented below.

**Further information required.** The largest of the five themes, 34.5% of all comments were included in this category, and on the whole expressed positive informational needs “The report does have value in explaining how the dollar figure is arrived at, but does not provide any other information that I would use to make a

decision”, comments included in this category also illustrate how important it is to tailor the report to the clients’ needs.

**Issues with the ROI equation or method.** Substantial agreement was reached on this theme, with 27.6% of participants making the comment that they had some issue with either the ROI equation or method, an example of the type of comments assigned to this theme: “I believe personally there are much more objective factors than purely dollars, which may or may not be achievable”. Another comment questioned the very basis on the ROI equation, “I find this model too simplistic and open to manipulation....A short course in one skill would probably show a much higher ROI than a longer comprehensive course which is misleading.”

**Issues with the report content.** Fair agreement was reached on the allocation of comments to this theme, with 16.1% of participants commenting about the limited content of the report, expressing concern at such factors as: focusing on the monetary value of the course; not enough information on the training program; additional factors not taken into account (cost of producing the report, redeployment of staff, university studies, personnel shortfalls in certain trades), a typical comment content is shown by this comment “I would prefer more information regarding the training program. That is, what the programme involves – a pure monetary value provides little information.” The hypothetical material used in the report was also a concern for some, one participant questioned assumptions made in the report: “This clearly is a valuable tool, but in examples such as this I think that a dollar value has been put on matters such as retention that cannot be justified”.



**Support for the ROI process/model.** Substantial agreement was reached on this theme, with 11.5% of participants expressing support for the ROI process through their comments. The following comment is a good example of comments within this theme, “The formula is easy to follow, and you don’t need a maths degree to understand it”. Other participants also saw the potential benefit for an ROI process being used within the New Zealand Defence Force (NZDF), “A simple (but robust) methodology standardised across the NZDF would be of great value to managers and staff”.

**Situational considerations.** Fair agreement was reached on allocated comments to the smallest of the themes which emerged, with only 10.3% of participants commenting on situational considerations. However, this theme is no less important as it represents the questions and concerns on how to implement ROI in an organisation. One of the more pertinent comments from this theme was “Which level do we start at? i.e. new entrant – senior courses, we are always on the training platform.”. Another comment in this theme was “...I would be concerned how we could reliably calculate the effect size.”

## **Overall Summary of Results**

Kruskal-Wallis non-parametric statistical test did not find significant differences between the three report types, on either the perceived usefulness or perceived understanding and clarity measurement items. An additional Kruskal-Wallis non-parametric statistical test was conducted on the individual items, however this did not find significant differences between individual items. The qualitative responses gained through the decision making instrument were analysed using content analysis, following which a Fleiss-Kappa inter-rater agreement statistic was performed. The levels of

agreement found ranged from medium to high. These levels of agreement indicate that the five themes/categories were appropriate for the comments received; however no clear perception either positive or negative towards ROI can be established due to the disbursement of comments across these five themes. Only two of the five themes directly indicate support, or lack thereof for ROI, while the remaining three do not directly comment on level of support. 60% of all comments were allocated by the raters to the three remaining themes, as these themes did not directly comment on the level of support received from participants, making an overarching comment on level of support received through qualitative comments is unjustifiable.

## CHAPTER 4

### Discussion

#### Overview of Research Findings

The present research investigated the perceptions of 33 personnel (32 Officers, 1 Non Commissioned Officer) within the Royal New Zealand Navy (RNZN), on return on training investment (ROI) reports, as a function of both perceived usability and perceived understanding and clarity of ROI calculations. Participants' perceptions of ROI were investigated through presenting research participants with three ROI report types (standard utility analysis (SUA), customised utility analysis (CUA), and critical outcome technique (COT)), as a function of two ROI calculations/processes utility analysis (UA), and COT. Participant perceptions were gathered through the use of a survey, collecting both quantitative and qualitative data.

The quantitative data was used to test two hypotheses on perceived usability and perceived understanding and clarity. These data were analysed using the Kruskal-Wallis non-parametric statistical test, but the results showed no statistical difference between reports.

The qualitative comments were analysed through content analysis, following which a Fleiss Kappa statistic was performed, this test showed strong levels of inter rater reliability when assigning comments to themes. Comments were spread across the five themes, with the theme 'Further information required' receiving more comments (35.4%) than any other theme assigned to it by the raters.

## **Detailed Discussion of Findings**

The lack of statistically significant differences between the three reports types was unexpected. Unlike previous research (Mattson, 2003) which the present research sought to extend, the method used in the present study to estimate SDy had been shown to be statistically more acceptable to organisational decision makers than other common methods of estimating SDy (Hazer & Highhouse, 1997). Indeed Mattson's (2003) use of another method of estimating SDy, formed a key question within the present research as to whether using the 40% Rule for SDy calculation may have provided different results within Mattson's study (2003). There is potential that the finding that estimating SDY through using the 40% rule has greater acceptance to managers (Hazer and Highhouse, 1997), while being an important part of utility analysis, may not be able to positively influence overall perceptions of ROI. While there are differences between the present research and of that completed by Hazer and Highhouse (1997), the differences between this research and previous research do not adequately explain the lack of statistical significance between the UA based reports and the COT based report. The expected difference in participants reported preferences between COT and UA based reports, was based on an assumption that using 40% Rule to estimate SDy, would cause significant preference differences within participants.

The methodology used to investigate the two presented hypotheses will be discussed in an attempt to understand why no statistical significance was found in this study. The rationale for expecting a significant difference between the UA based ROI reports and the COT based ROI report, is informed by Mattson's (2003) study, within which previous findings on SDy calculation and participants' preference (Hazer and

Highhouse, 1997) appear to have been ignored in the selection of a method of calculating SDy.

The present research utilised the familiar methodology of presenting ROI reports derived from alternative methods of calculating ROI, an approach used frequently with ROI research (i.e. Mattson, 2003; Wrinkler et al, 2010). This is similar to the approach used by Whyte and Latham (1997) in their study, albeit with non-ROI alternatives presented, within which they strongly questioned the validity of utility analysis as a means of informing organisational decision makers. An interesting aspect of this research was the use of an acknowledged expert in utility analysis, who provided a videoed presentation on utility analysis while also being present to answer any questions which participants might have. A key contention raised by Cronshaw (1997), which is equally applicable to the present research, is that rather than the proposed informational hypothesis being tested, a persuasion hypothesis was actually tested. Cronshaw (1997), in critiquing the research (Whyte & Latham, 1997), cited the literature on persuasion and attitude change (Eagly & Chaiken, 1993), specifically that using high-pressure persuasive tactics in the promotion of a concept which already has some acceptance, can decrease the present level of acceptance. This contention may be applicable to the present research, as participants were aware that the RNZN was interested in adopting ROI on training investment as a decisional aid, in addition the RNZN and potentially some participants had already utilised ROI as an evaluation tool for a retention bonus scheme (as outlined in Chapter 1). Indeed the results from the present research were to be used to assist in informing which ROI method was most favourably received by participants who were also stakeholders in the training area. Within the present research, high-pressure

tactics were not purposefully utilised. However the participants knowledge that the findings of the research would be used to inform a decision on ROI within the RNZN, may have inadvertently created a high-pressure situation. It is possible that the same methodological flaw which Cronshaw (1997) proposed of previous research (Whyte & Latham, 1997) could have been present within this research, with the outcome being reported preference scores which form a standard normal distribution curve – resulting from participants displaying caution when providing preference ratings.

Unlike the majority of previous studies on ROI (i.e. Latham & Whyte, 1994; Mattson, 2003; Whyte & Latham, 1997), the present research was done within a single organisation, an organisation which sought to be informed by the research with potential to adopt the findings for real world application. Potentially this moves the research from what was constructed as a purely information sharing exercise – with serious questions as to whether or not it was a persuasional exercise, to potentially an unmanaged change exercise.

By providing Senior Officers with information on ROI, on the premise that the report type they select will be used by the RNZN to inform a decision on implementation, the question should be raised as to whether the change aspect which existed alongside this research was adequately addressed. For example within the presentations to the research participants questions were raised within all three presentations by the participants as to how ROI would be applied within the RNZN, with concern voiced over the use of ROI across all training programs – as not all programs have a measurable output. Military history is an excellent example of a training course which does not have a measurable output – as typically defined by improved performance. Military history

within the RNZN context forms part of the induction of new personnel. The specific concern of evaluating this training course was raised directly with the researcher, which suggests the requirement for a managed change process. Addressing concerns on how the preferred ROI method might be used within the RNZN was not formally part of the research scope; rather this may have been more appropriately addressed through internal communications – potentially as part of a change process. Indeed a key value of ROI is its predictive ability, an ability which can be utilised to reduce spending while maintaining the capacity of personnel – can this be taken for granted that potentially some of the participants may have had an interest in maintaining the status quo in regards to training evaluation. A brief overview of Lewin’s (1951) change process is presented below, for the purpose of informing future organisation specific ROI research.

While many models of change exist, the three stage model presented by Lewin (1951) is both well-known and appropriate for this discussion. Lewin proposed that change has three distinct phases: unfreezing, change, and freezing. Unfreezing refers to the stage where the initial attitudinal inertia is overcome through dismantling the individual/group specific beliefs, practices, and psychological self-defence mechanisms. Unfreezing is the most important of the three stages, as it establishes within the individual or group, the need for change – a change process without a well-planned and executed unfreezing phase will often result in individuals or members of the targeted group, not ‘buying-in’ to the change process. The change phase is where the actual change takes place, be it a psychological or behavioural change. With the last phase of change, freezing, being the cementing of the change within the individual or group. Considering the organisational environment within which this research took place, it has

become apparent that change was an integral part of the research – however change was not addressed, potentially at the detriment of the research. Given the context that the research was presented within, that of an organisation investigating different methods of calculating and reporting ROI as an evaluation methodology for use on training programs (both present and future training initiatives), no account was given within the research as to establishing the need for change (unfreezing). Participants were invited to participate in the research for the purpose of gaining information on ROI, and submitting their preferences via a questionnaire. The use of this information as the basis of informing potential use was known within the participant groups, however no information which would typically be issued as part of the unfreezing process was provided. Without further investigation into perceptions on how this information might be used, and how participants perceived the use of this information as positive, negative, or simply not required, the direction of the possible impact remains unknown. The important aspect to consider from this concern when basing ROI research in a single organisation, for the purpose of informing the potential adoption of an ROI calculation to information decision makers within that organisation, is that change and managing that change at the unfreezing stage is a consideration which should be addressed as part of the research methodology.

After examination of potential factors which may have accounted in some part towards the central tendency of perceived usefulness and perceived understanding and clarity scores, the qualitative data is discussed below. The examination of qualitative data may yield further understanding as to why no statistical significance was found in the present research.



Research is not done within a vacuum, and the goal of the present research may have been pursued at the neglect of the taking into account the context of which ROI takes place – specifically how ROI would be applied within the RNZN. Of the comments made by participants within the current study, only 27.6% of comments were allocated to the ‘Issues with the ROI equation or method’ theme, with the majority of comments being assigned to one of four other themes unrelated to issues with the equation/method. From this information, it can be presented that within the present research over 70% of participants (excluding four that chose not to make a comment), chose to comment on areas other than having issue with the equation/method. Essentially the presented research neglected to answer over 60% of research participants questions about UA (having subtracted the 11.5% of participants in this study whose comments were supportive of ROI from the 70% of participants whose comments were not placed under the ‘Issues with the ROI equation or method’ theme). Issues which potentially gave rise to over 60% of questions are outlined and discussed below, followed by discussion of the 27.6% of comments allocated to issues with the ROI equation/method theme.

*Situational considerations.* As put forward by Hazer and Highhouse (1997), by merely communicating the financial value of a human resources activity may not sufficiently convince organisational decision makers of the validity of the financial value, rather the process used to calculate the financial value must also be explained. Conversely a critical aspect of ROI, is that the individual calculating the value, be they an external consultant or internal employee, understands the context and organisational setting within which the calculation is being applied. While a smaller theme with only 10.3% of participants citing situational considerations, if the situational considerations

had of been addressed, these participant may have had the information to form a positive or negative perception of ROI.

Unlike the present research, the majority of studies on ROI (Latham & Whyte, 1994; Mattson, 2003; Whyte & Latham, 1997) have utilised participants from diverse organisations, an attribute which may heighten the ability to make generalisations about the study's findings. The contention, however, is that by having participants from a variety of organisations, contextual factors such as how will ROI be used in the participants organisation, what potential obstacles need to be overcome cannot be addressed appropriately. Thus it is possible that the results of the present research and potentially the results of previous studies may have been affected by participants' concerns or questions about situational factors which may not have been taken into account or been answered to a satisfactory level.

***Issues with the report content.*** A separate but related theme to situational considerations was issues with the report content, with 16.1% of comments from participants being allocated to this theme. The report was developed in isolation from the RNZN, and in hindsight the lack of engagement with this critical aspect of the research may prove to be an error. If engagement with the RNZN had taken place, there may have been potential for the comments allocated to this theme to be reduced, through providing a more grounded and realistic hypothetical report. While the main body of the report was accepted as feasible, the outcomes of the training program presented within the report did not correspond well with internal organisational data. An example of this was the increased participation by organisational members in organised sport which the report suggested had been a result of the training program; the increased level of fitness which

came out of this increased participation was then given a monetary value. However, participants communicated both verbally and in writing that RNZN data show the majority of injuries suffered by RNZN personnel occur during sporting activities – the cost of which may have negated the monetary amount awarded for the fitness benefits to the organisation. One potential option which could have been explored was the use of the ROI analysis of the published RNZN Marine Engineers retention bonus scheme (Phillips & Phillips, 2002). Through use of this material and approach, many of the issues with report content may have been addressed, allowing participants to focus their attention on the report style, and ROI calculation, rather than questioning the validity and appropriateness of the training program within the hypothetical report.

***Further information required.*** This was the dominant theme, with 34.5% of all comments being allocated to this theme. Indeed during the research presentations within which the three ROI report types were presented, there was some unease within the research groups at not having the opportunity to be introduced to all three ROI report types. With some participants expressing a desire to make an informed decision on which ROI report type they preferred from the available options, rather than being restricted to being presented with only one of three possible ROI options. Within the present research this was an unanticipated issue, but one which may have contributed to an overall lack of preference between the presented report types, potentially leading to the experienced central tendency of the returned preference scores across the three report types.

A number of comments within this theme made mention of ROI being one potential source of information on which to make an informed decision about the success of a

training program, and that they were unable to make a decision based on financial factors alone. These comments reflect an error in positioning of ROI as a single source of information, from which training program decisions can be solely based on. The wording of this question within the survey instrument specifically sought the level of agreement which participants had towards basing a training decision solely on the information contained in the ROI report. The wording of this question, potentially impacted on the agreement level gained for this item in the survey instrument.

***Support for the ROI process/model.*** 11.5% of participants within the present research expressed support for the ROI process/model. This percentage was very low, even after considering some of the potential confounding variables discussed above.

***Issues with the ROI equation or method.*** 27.6% of participants had issues with the ROI equation or process, ranging from issues which could be addressed, to issues which could not be addressed without significant alteration to the presented methods. While almost 1/3 of participants taking issue with some aspect of the presented methods cannot be considered a positive recommendation for ROI, neither does it reflect the negative findings of earlier studies (Latham & Whyte, 1994).

In summary, the qualitative comments and percentages of allocation across the five themes may be of assistance for future research. While support for the presented methods of calculating ROI was lower than desired, the majority of comments rather than taking issue with the ROI equation or method, focused on issues or questions left unanswered by the researcher.

## **Discussion of Practical Implications**

The similarity in mean scores for both perceived usefulness and perceived understanding and clarity between the three report types presented within Chapter 3 has implications for the RNZN, primarily the present study does not provide the RNZN with a preferred ROI method. This is a significant limitation, as a desired outcome of the present research was to inform the RNZN on which ROI method was preferred by its decision makers within the training area.

The implications for the field of inquiry into ROI were that future research is warranted. This study supports the findings of previous research (Carson et al. 1997; Mattson 2003; Macan & Foster, 2004), and further questions the validity of Latham and Whyte's (1994) findings which were summed up with the statement that UA "succeeds in reducing managers' commitment to and confidence..."(1994, p.40) validated selection procedures.

A further potential implication for the field of ROI inquiry, are reflected in the questions raised above. For example, if the method and delivery used in the presented research is comparable to past research, then the methods used in the investigation of ROI must be re-evaluated.

## **Strengths and Limitations of the Research**

As mentioned above, unlike most other studies into managers' perceptions of ROI, this research was carried out within a specific organisation, utilising participants solely from the RNZN rather than from a variety of organisations. From the discussion above, this has potentially been both a strength and a limitation of the present research. The

ability to present ROI information within a single organisation allowed the hypothetical ROI report to be based within the RNZN, utilising ‘characters’ such as Physical Trainers, and ‘activities’ such as physical training which were familiar to participants. A potential limitation discussed above, however is that the organisational context was not clearly understood by the researcher, a lack of clarity which was noticed by participants. Also, limiting inclusion to participants from one organisation did result in a lower number of participants than previous studies have attracted (e.g. Latham & Whyte, 1994; Mattson, 2003; Whyte & Latham, 1997). Reduced participant numbers within quantitative research had the impact of reducing the statistical power of the research, to the point that small effect sizes which may have been found within research with larger participant numbers remained unsupported within the present research.

Presenting qualitative data has not been popular with previous UA focused research (Latham & Whyte, 1994; Macan & Foster, 2004; Mattson, 2003), however the recording and analysis of this data type have provided valuable insights into this area, insights which have not been presented within previous research papers. This lack of qualitative data in previous research may be an influencing factor why the field has not progressed beyond finding a ‘lukewarm’ response on UA from research participants (i.e. Whyte & Latham, 1997; Mattson, 2003).

### **Future Directions for ROI Research**

As identified above, there are a number of potential reasons why the present research was unable to show differences in preference between the three report types, which may be useful for future research within this area. Most notably, the research

methodology used may have caused the observed central tendency of the mean preference scores across the three report types, as participants within the present research may have been uncomfortable making preference decisions without being fully informed of other ROI options available to them.

There are also questions about the timing of this research, with regards to the potential implementation of a ROI evaluation process within the training area of the RNZN. Ideally a change management process should have been undertaken prior to this research and the presentation of alternative ROI reports, as there are questions as to whether or not the participants were ready to consider the adoption of an ROI evaluation approach within the RNZN. The readiness of participants to consider the adoption of ROI evaluation, may have been positively influenced through a change management process. It is critical that organisational factors, such as the potential for implementing ROI, be understood and taken into account, prior to conducting research within a single organisation. Research based within a single organisation provides the researcher(s) with the ability to engagement with the organisation – and potentially provide real value through research findings to the organisation. However there is a need to be aware that research within single organisations can also raise a number of challenges when completing research.

As mentioned above, the hypothetical training results used within the hypothetical training report could have been conducted in consultation with the organisation, specifically the RNZN Training School. The decision not to consult with RNZN personnel was informed by organisational time constraints. The oversights made within the hypothetical training report potentially took the focus of participants away from the

ROI process and calculation, and from the report itself. The errors may have also caused participants to question the knowledge and understanding of ROI which the researcher had, potentially leading to mistrust or uncertainty on other aspects of the research.

The collection of qualitative data from this study has added positively to the current research, and may add positively to future research in this area. There is also potential to enrich the qualitative data gained, through the use of discussion or focus groups, to gain further information to inform future research. A key gap within the present research was the inability to fully analyse the data, both at a quantitative and qualitative level. Some future research directions within this area may concentrate on having further focus groups to discuss initial findings, taking a collaborative approach to research, rather than maintaining the traditional divide between researcher(s) and participants.

## **Conclusion**

In summary, the quantitative results gained from this research study have not directly advanced the ROI area of study. However, in presenting potential reasons why significance differences were not found between the three report types, in combination with the information gained from qualitative data, advances in ROI research methodology may result from the present research. The present research clearly demonstrates that further research into UA is warranted, and does not support the finding that UA “succeeds in reducing manager’ commitment to and confidence” in human resource development initiatives (Latham & Whyte, 1994, p.40).



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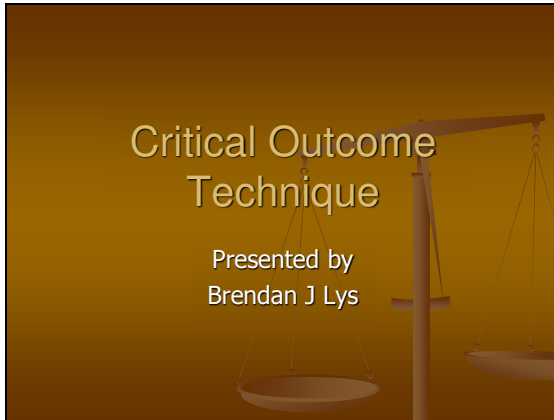
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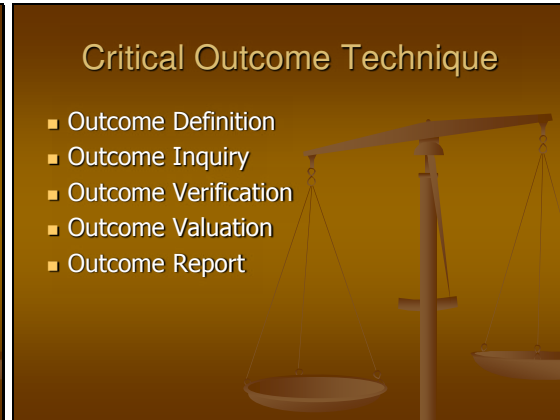
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## Appendix A: COT Presentation

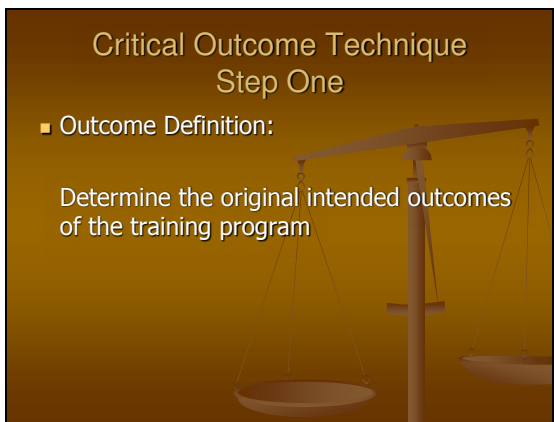
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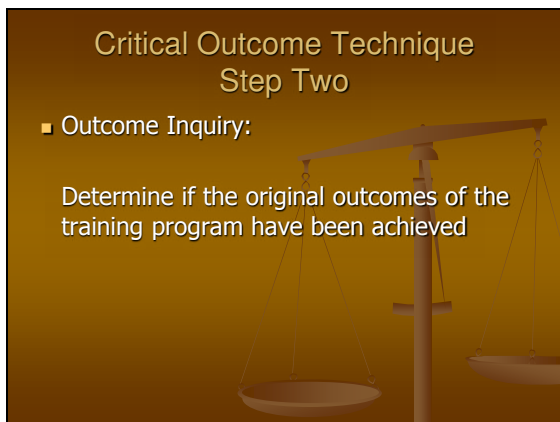
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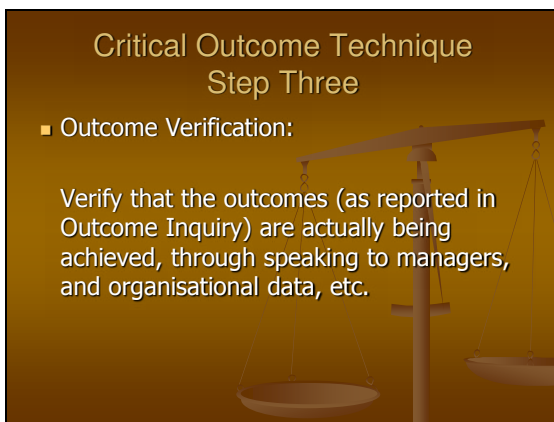
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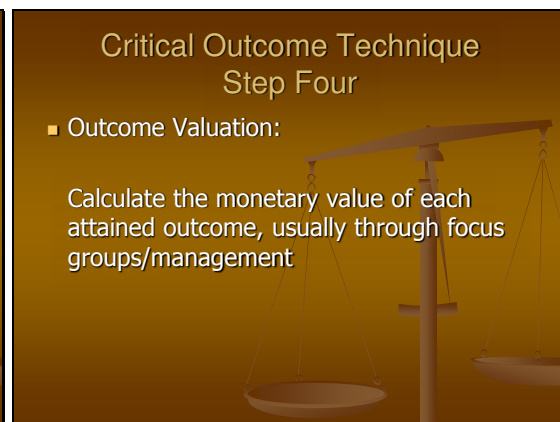
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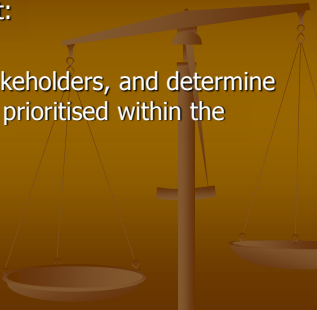


Slide 7

### Critical Outcome Technique Step Five

- Outcome Report:

Consult with stakeholders, and determine what they want prioritised within the report.

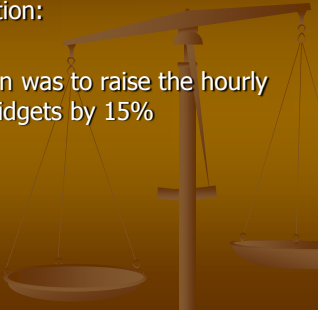


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### Critical Outcome Technique: An Example

- Outcome Definition:

Original intention was to raise the hourly production of widgets by 15%

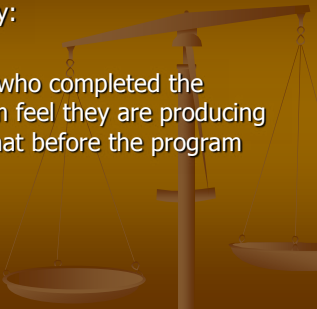


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### Critical Outcome Technique

- Outcome Inquiry:

Widget makers who completed the training program feel they are producing more widgets than before the program

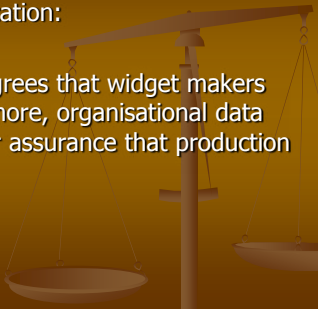


Slide 10

### Critical Outcome Technique

- Outcome Verification:

Management agrees that widget makers are producing more, organisational data provides further assurance that production has increased

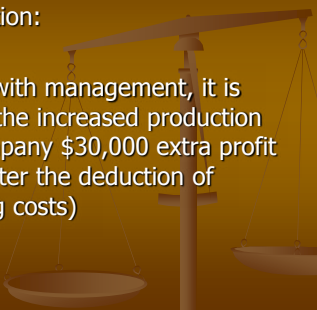


Slide 11

### Critical Outcome Technique

- Outcome Valuation:

After speaking with management, it is calculated that the increased production will net the company \$30,000 extra profit (this figure is after the deduction of \$10,000 training costs)

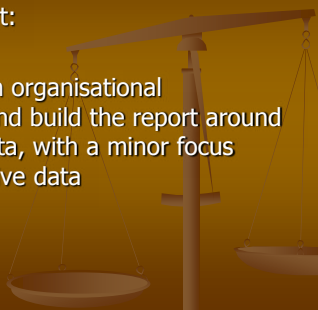


Slide 12

### Critical Outcome Technique

- Outcome Report:

We consult with organisational stakeholders, and build the report around the financial data, with a minor focus around qualitative data





## **Appendix B: COT Speakers notes**

### Introduction

Good morning, thank you all for attending this presentation. My name is Brendan Lys, currently I am a masters student at Waikato University studying organisational psychology. With the assistance of the RNZN, I have been investigating critical outcome technique, a way of estimating the financial return on organisational investment in human resource programs, critical outcome technique belongs to a group of estimation procedures known as return on investment. These procedures view human resource activities as investments, for example while we have to spend money on selection, what would it mean to the organisation if we invested some money into a more valid selection procedure, or in terms of training, what financial benefit would we gain by sending some managers through an Executive MBA program? These are the types of questions which return on investment can provide information for, allowing the decision makers to be better informed about the consequences of a particular human resources investment.

Shortly I will be explaining how critical outcome technique works, please feel free to ask any questions during or after this, following any questions you may have, you will be presented with a written scenario and a critical outcome technique report, after reading this material I would be most grateful if you would complete a short survey. The survey is anonymous and has questions about; how useful you found the information contained in the report, the ease with which the information was understandable, and the level of difficulty you had in understanding the method of calculating the return on training investment. The responses you provide today will assist the RNZN in developing their own return on investment tool. The value for the RNZN of using a tool such as Critical Outcome Technique, is that it allows for human resource programs (and other organisational investments) to be compared beyond merely the cost, and can allow for the comparison of results from proposed investments. Thank you for your time and assistance with this research.

### Presentation

The purpose of critical outcome technique, or return on investment, as it is often referred to as, is to determine, in monetary terms, the gain or loss anticipated from a human resource development activity, while today we will be focusing on the critical outcome of a hypothetical training exercise, critical outcome technique has been used in such human resource activities as; selection, recruitment, and employee retention.

The main benefit of being able to determine the financial return on a human resource activity, is that it enables individuals to compare these activities in relation to maximising organisational return, an example of this type of comparison could be deciding whether to retain already trained staff through increased remuneration, or to recruit new staff who will need to be trained.

Critical outcome technique is a five step evaluation process, the five steps are;

1. Outcome definition
2. Outcome inquiry
3. Outcome verification
4. Outcome Valuation
5. Outcome report

The first step, outcome definition, is where the original intended outcomes of the program are determined, this is often accomplished through; reviewing the needs analysis which lead to the program, and speaking to the originators of the program.

The second step, outcome inquiry, involves the evaluator collecting data from program participants regarding their attainment of the intended outcomes

Outcome verification, the third step, allows for the data collected in the second step to be verified via the information provided by program participants being checked against other sources of information; examples of this are supervisors, performance reports and other organisational data.

Within step four, outcome valuation, the evaluator determines the monetary value for each outcome, this is usually accomplished through a combination of focus groups, consisting of supervisors and managers, etc, and financial data from the organisation, and. It is also at this stage that the costs of the program are deducted from the value of the outcomes, resulting in a return on investment figure.

Step five consists of the production of a summary report of the evaluation, this is also completed with feedback from key stakeholders in terms of what is important to them, stakeholders are individuals who have a vested interested in the organisation, i.e. shareholders, board of directors and management.

Lets run through an example of critical outcome technique, using a widget making training course as the subject;

Step one, we determine through viewing the needs analysis and training program goals, that the programs original intention was to increase the hourly production of widgets by 15%.

Step two, though speaking with many of the program participants we find that they feel that they are indeed producing more widgets now, than they were prior to the training program.

Step three, we speak to supervisors and managers regarding the belief of the program participants that they are now producing more widgets, both the supervisors and managers support this belief with widget production numbers for the last month following training.

Step four, after speaking with sales and management, we determine that with an increased production of widgets through the ten program participants, the company will make an extra \$30,000 in profit over the next 12 months.

Step five, in consulting with the organisational stakeholder, they tell us that they are primarily interested in the financial consequences of the training, from this feedback we build the report around the financial data collected, allocating less report space to qualitative data, e.g. increased job enjoyment by widget makers.

#### Question Period

Were there any questions regarding the content of the video or the any other issues regarding this presentation?

If you could look now at the written material, I would appreciate if you could complete the reading and survey individually, as I am interested in your own personal perception and acceptance of the material. Please begin.

#### Reading and completion of written material and survey

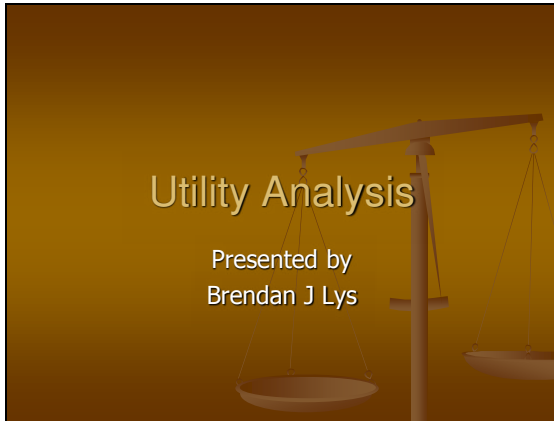
#### End of presentation

Thank you all for your participation in today's research. As I have more presentations to complete, I would greatly appreciate if you did not discuss the material you viewed here until after today. At the completion of my research, the results will be available if anyone is interested in viewing them, please feel free to email me.

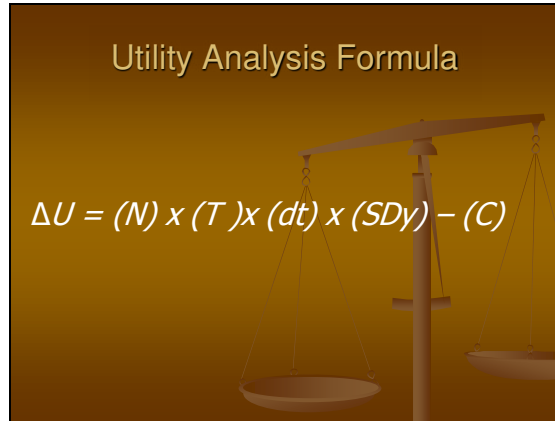
If there are no further questions or queries, thank you again for your assistance and I hope you all enjoy the rest of your day.

## Appendix C: SUA Presentation

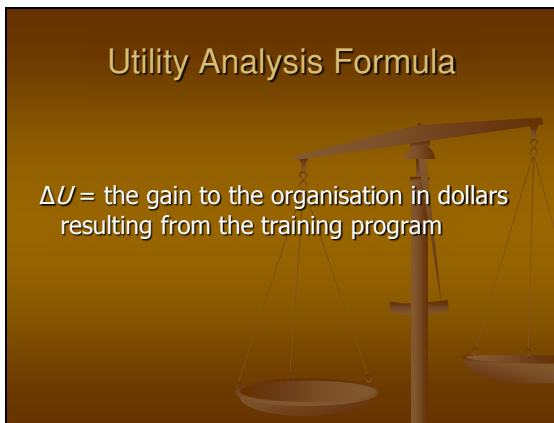
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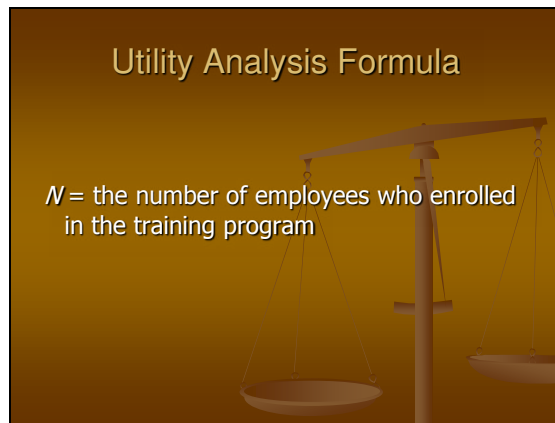
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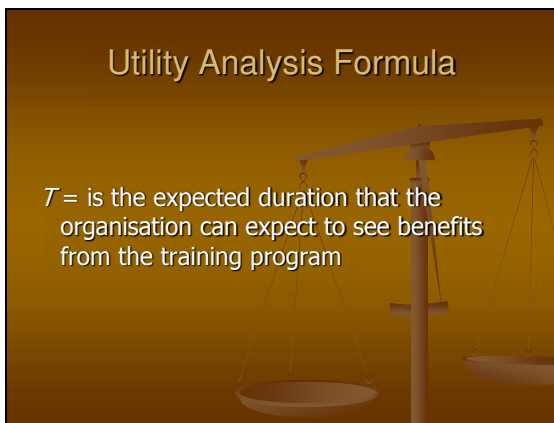
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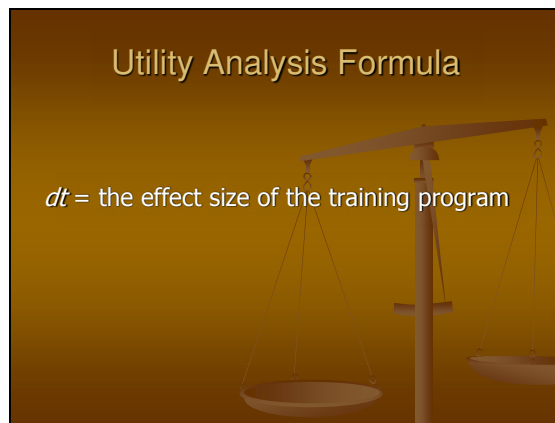
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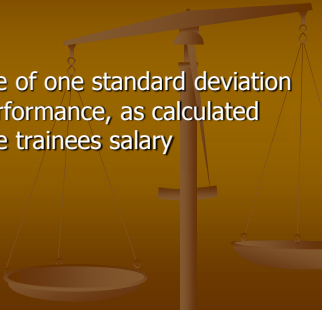
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Slide 7

### Utility Analysis Formula


$SDy$  = dollar value of one standard deviation of employee performance, as calculated from %40 of the trainees salary



Slide 8

### Utility Analysis Formula

$C$  = the total cost of the training program

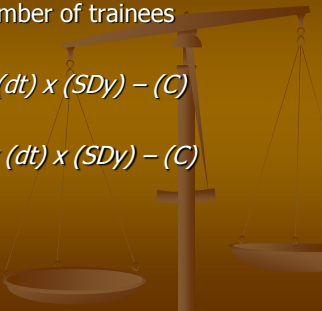


Slide 9

### Utility Analysis: An Example

Enter the total number of trainees

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$

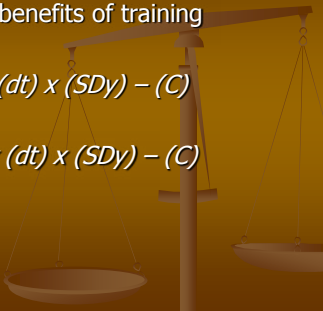
$$\Delta U = (10) \times (T) \times (dt) \times (SDy) - (C)$$


Slide 10

### Utility Analysis: An Example

Enter duration of benefits of training

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$

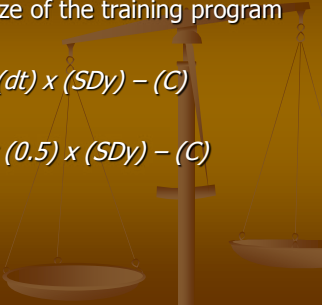
$$\Delta U = (10) \times (1) \times (dt) \times (SDy) - (C)$$


Slide 11

### Utility Analysis: An Example

Enter the effect size of the training program

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$

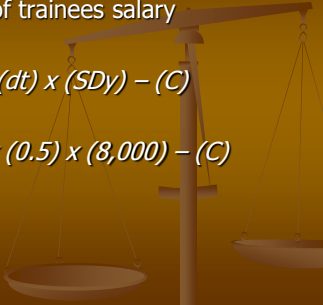
$$\Delta U = (10) \times (1) \times (0.5) \times (SDy) - (C)$$


Slide 12

### Utility Analysis: An Example

Enter  $SDy$ : 40% of trainees salary

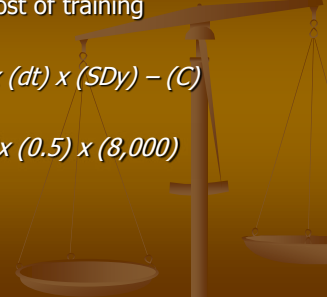
$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$

$$\Delta U = (10) \times (1) \times (0.5) \times (8,000) - (C)$$


Slide 13

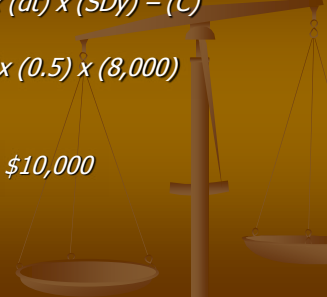
### Utility Analysis: An Example

Enter the total cost of training

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$
$$\Delta U = (10) \times (1) \times (0.5) \times (8,000) - (10,000)$$


Slide 14

### Utility Analysis: An Example

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$
$$\Delta U = (10) \times (1) \times (0.5) \times (8,000) - (10,000)$$
$$\Delta U = \$40,000 - \$10,000$$
$$\Delta U = \$30,000$$


## **Appendix D: SUA Speakers notes**

### Introduction

Good morning/afternoon/evening, thank you all for attending this presentation. My name is Brendan Lys, currently I am a masters student at Waikato University studying organisational psychology. With the assistance of the RNZN, I have been investigating utility analysis, utility analysis is a way of estimating the financial return on organisational investment in human resource programs, utility analysis belongs to a group of estimation procedures known as return on investment. . These procedures view human resource activities as investments, for example while we have to spend money on selection, what would it mean to the organisation if we invested some money into a more valid selection procedure, or in terms of training, what financial benefit would we gain by sending some managers through an Executive MBA program? These are the types of questions which return on investment can provide information for, allowing the decision makers to be more fully informed about the consequences of a particular human resources investment.

Shortly I will be explaining how utility analysis works, please feel free to ask any questions during or after this, following any questions you may have, you will be presented with a written scenario and a utility analysis report, after reading this material I would be most grateful if you would complete a short survey. The survey is anonymous and has questions about; how useful you found the information contained in the report, the ease which with the information was understandable, and the level of difficulty you had in understanding the method of calculating the return on training investment. The responses you provide today will assist the RNZN in developing their own return on investment tool. The value for the RNZN of using a tool such as utility analysis, is that it allows for human resource programs (and other organisational investments) to be reviewed beyond merely the cost, and can allow for the comparison of results from proposed investments. Thank you for your time and assistance with this research.

### **Presentation**

The purpose of utility analysis, or return on investment, as it is often referred to as, is to determine, in monetary terms, the gain or loss anticipated from a human resource development activity, while today we will be focusing on the utility analysis of a hypothetical training exercise, utility analysis has been used in such human resource activities as; selection, recruitment, and employee retention.

The main benefit of being able to determine the financial return on a human resource activity, is that it enables individuals to compare investments, an example of this type of comparison could be deciding whether to retain already trained staff through increased remuneration, or to recruit new staff who will need to be trained.

Like most accounting procedures, utility analysis can be written as a formula;

$$\Delta U = (N) \times (T) \times (dt) \times (SDy) - (C)$$

$\Delta U$  (Delta U) is simply the monetary value, the answer once we insert the values into the equation.

$N$  is simply the number of individuals who enrolled in the training.

$T$  is the time or duration that we expect the effect of the training to last, as time goes by the effect of the training diminishes.

$dt$  is the effect size of the training, think of effect size as the score on a test after a course, lets say that from a class of 10 students, their average mark on the test before they attended the training course was 25%, after finishing the course the average mark was 95%, so in terms of an effect size – how much did the training course change their behaviour or knowledge, we can say that the course was 70% effective, or rather had an effect size of 0.7.

$SDY$  is the dollar value of a standard deviation of employee performance. A standard deviation is a measurement which tells us how much the individuals vary in a sample. So when we apply this measurement to individuals within the same job, what the standard deviation tells us is by how much the individuals vary on average in terms of dollar performance value to the organisation. We estimate this standard deviation of employee performance by using %40 of the total salary of the position. This method has shown to return similar values as more complex and time consuming methods. This standard deviation, provides a unit of improvement, if for example a training course has an effect size of 0.7, then we multiply our standard deviation by the effect size, gaining an estimation of the average performance improvement of each individual who completed the training program

$C$  quite simply represents the total cost of the training.

Lets run through an example of utility analysis, using a widget making training course as an example

Firstly, we must identify the number of participants who passed the training program, in this case all 10 participants achieved a pass mark, so our  $N = 10$ .

Secondly we estimate the time ( $T$ ) which the effects of training will last, this is often accomplished through asking subject matter experts, such as managers or trainers. Time can also be affected by turnover rates, and promotions within the organisation. In our widget training program example, we estimate that the effect of training will last for one year, so  $T = 1$ .

Next we must estimate the effectiveness of the training program, by how much did the training program contribute to the behavioural change of our widget makers. Our



widget makers were given a practical pre-training test on widget making, the average mark was 25%, following the training, the average mark rose to 75%, indicating a training effect of 0.5.

In the fourth step we estimate the standard deviation,  $SD_y$ , of employee performance by taking %40 of the total salary for the position. In this case the salary is \$20,000 standard deviation, or the average difference between employees is \$8,000.

We then calculate our total cost of the training program, this includes the cost of running the training program, the salaries of the trainees, lost productivity due to having the trainees off site, travel, and accommodation etc. In this case, the total cost of the training program was \$10,000.

$$\Delta U = 10 (N) \times 1 (T) \times 0.5 (dt) \times \$8,000 (SD_y) - \$10,000 (C)$$

$$\Delta U = \$40,000 - \$10,000$$

$$\Delta U = \$30,000$$

So for an investment of \$10,000 dollars in training widget makers, the organisation can expect to receive \$30,000 profit through increased job performance over a one year period.

### **Question Period**

Were there any questions regarding the content of the video or any other issues regarding this presentation?

If you could look now at the written material, I would appreciate if you could complete the reading and survey individually, as I am interested in your own personal perception and acceptance of the material. Please begin.

### **Reading and completion of written material and survey**

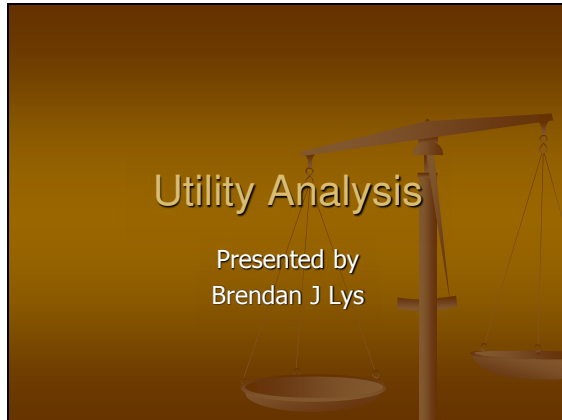
### **End of presentation**

Thank you all for your participation in today's research. As I have more presentations to complete, I would greatly appreciate if you did not discuss the material you viewed here until after today. At the completion of my research, the results will be available if anyone is interested in viewing them, please feel free to email me.

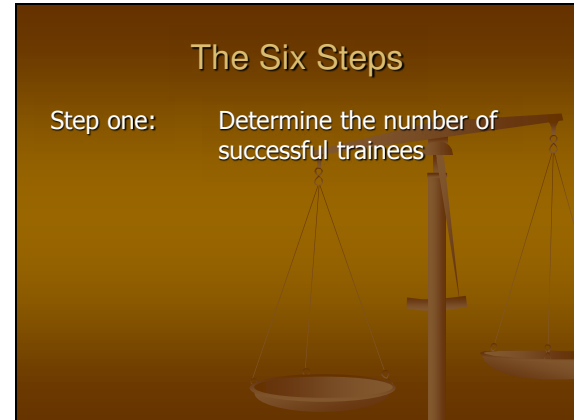
If there are no further questions or queries, thank you again for your assistance and I hope you all enjoy the rest of your day.

## Appendix E: CUA Presentation

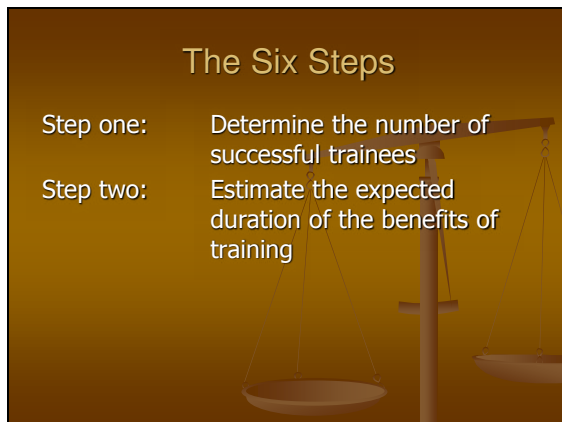
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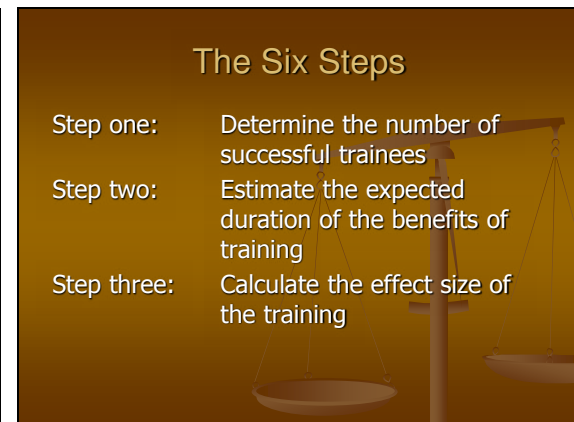
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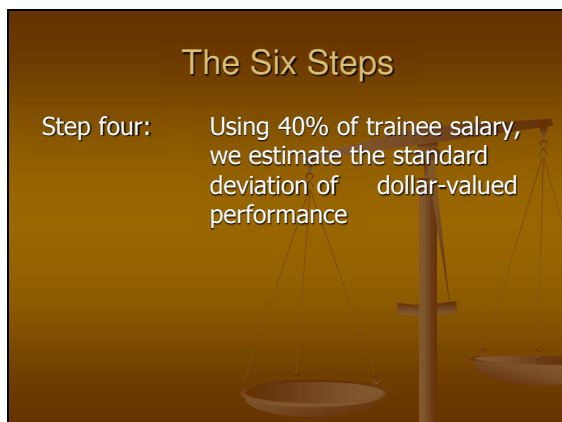
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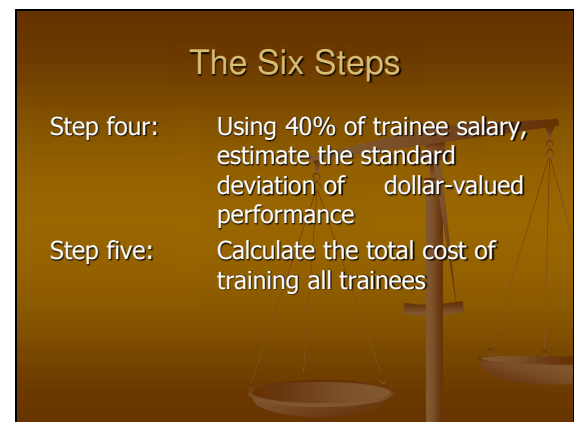
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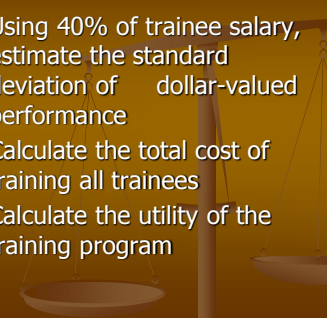
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### The Six Steps

Step four: Using 40% of trainee salary, estimate the standard deviation of dollar-valued performance

Step five: Calculate the total cost of training all trainees

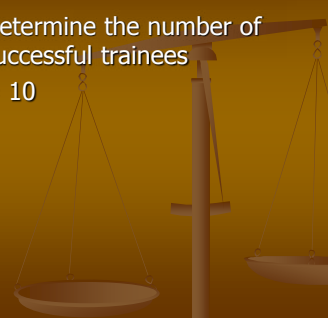
Step six: Calculate the utility of the training program



Slide 8

### Utility Analysis: An Example

Step one: Determine the number of successful trainees  
= 10

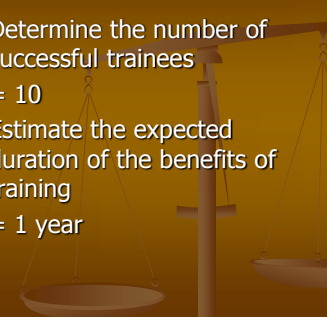


Slide 9

### Utility Analysis: An Example

Step one: Determine the number of successful trainees  
= 10

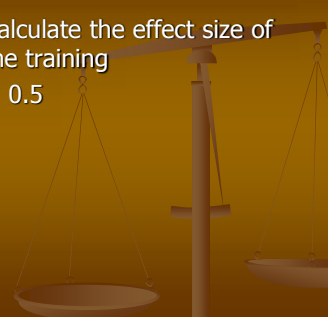
Step two: Estimate the expected duration of the benefits of training  
= 1 year



Slide 10

### Utility Analysis: An Example

Step three: Calculate the effect size of the training  
= 0.5

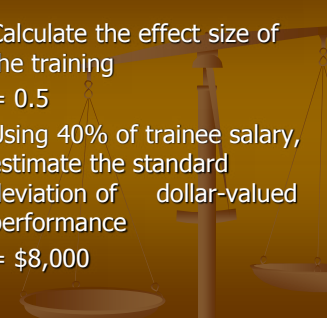


Slide 11

### Utility Analysis: An Example

Step three: Calculate the effect size of the training  
= 0.5

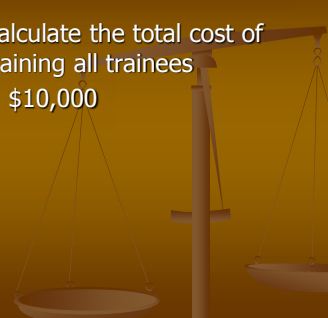
Step four: Using 40% of trainee salary, estimate the standard deviation of dollar-valued performance  
= \$8,000



Slide 12

### Utility Analysis: An Example

Step five: Calculate the total cost of training all trainees  
= \$10,000



Slide 13

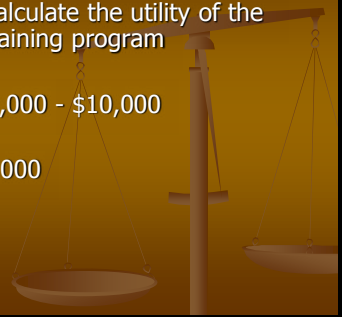
### Utility Analysis: An Example

Step six: Calculate the utility of the training program

$$10 \times 1 \times 0.5 \times \$8,000 - \$10,000$$

$$= \$40,000 - \$10,000$$

$$= \$30,000$$



## **Appendix F: CUA Speakers notes**

### Introduction

Good morning/afternoon/evening, thank you all for attending this presentation. My name is Brendan Lys, currently I am a masters student at Waikato University studying organisational psychology. With the assistance of the RNZN, I have been investigating utility analysis, a way of estimating the financial return on organisational investment in human resource programs, utility analysis belongs to a group of estimation procedures known as return on investment. These procedures view human resource activities as investments, for example while we have to spend money on selection, what would it mean to the organisation if we invested some money into a more valid selection procedure, or in terms of training, what financial benefit would we gain by sending some managers through an Executive MBA program? These are the types of questions which return on investment can provide information for, allowing the decision makers to be more fully informed about the consequences of a particular human resources investment.

Shortly I will be explaining how utility analysis works, please feel free to ask any questions during or after this, following any questions you may have, you will be presented with a written scenario and a utility analysis report, after reading this material I would be most grateful if you would complete a short survey. The survey is anonymous and has questions about; how useful you found the information contained in the report, the ease with which the information was understandable, and the level of difficulty you had in understanding the method of calculating the return on training investment. The responses you provide today will assist the RNZN in developing their own return on investment tool. The value for the RNZN of using a tool such as utility analysis, is that it allows for human resource programs to be compared in terms of financial results with other proposed investments. Thank you for your time and assistance with this research.

### Presentation

The purpose of utility analysis, or return on investment, as it is often referred to as, is to determine, in monetary terms, the gain or loss anticipated from a human resource

development activity, while today we will be focusing on the utility analysis of a hypothetical training exercise, utility analysis has been used in such human resource activities as; selection, recruitment, and employee retention.

The main benefit of being able to determine the financial return on a human resource activity, is that it enables individuals to compare investments, an example of this type of comparison could be deciding whether to retain already trained staff through increased remuneration, or to recruit new staff who will need to be trained.

Utility analysis is a six step procedure

- Step one: We determine the number of trainees who successfully completed the training course
- .
- Step two: We estimate the duration that we expect the effect of the training to last, as time goes by the effect of the training diminishes.
- Step three: We calculate the effect size of the training; this calculation is often accomplished by pre and post training testing of the trainees. For example, from a class of 10 students, their average mark on the test before they attended the training course was 25%, after finishing the course the average mark was 95%, so in terms of an effect size – how much did the training course change their behaviour or knowledge, we can say that the course was 70% effective, or rather had an effect size of 0.7.
- Step four: We estimate the dollar value of a standard deviation of employee performance. A standard deviation is a measurement which tells us how much the individuals vary in a sample. So when we apply this measurement to individuals within the same job, what the standard

deviation tells us is by how much the individuals vary on average in terms of dollar performance value to the organisation. We estimate this standard deviation of employee performance by using %40 of the total salary of the position. This method has shown to return similar values as more complex and time consuming methods. This standard deviation, provides a unit of improvement, if for example a training course has an effect size of 0.7, then we multiply our standard deviation by the effect size, gaining an estimation of the average performance improvement of each individual who completed the training program

Step five: Calculate the total cost of the training.

Step six: Calculate the utility of the training program.

Lets run through an example of utility analysis, using a widget making training course as an example

Firstly, we must identify the number of participants who passed the training program, in this case all 10 participants achieved a pass mark.

Secondly we estimate the time which the effects of training will last, this is often accomplished through asking subject matter experts, such as managers or trainers. Time can also be affected by turnover rates, and promotions within the organisation. In our widget training program example, we estimate that the effect of training will last for one year.

Next we must estimate the effect size of the training program, by how much did the training program contribute to the behavioural change of our widget makers. Our widget makers were given a practical pre-training test on widget making, the average

mark was 25%, following the training, the average mark rose to 75%, indicating a training effect size of 0.5.

In the fourth step we estimate the standard deviation of employee performance by taking 40% of the total salary for the position. In this case the salary is \$20,000, so the standard deviation or the average difference between employees is \$8,000.

In the fifth step, we calculate the cost of the training, which in this example is \$10,000.

The final step is to actually calculate the utility of the training program:

$$(10 \times 1 \times 0.5 \times \$8,000) - \$10,000$$

$$= \$40,000 - \$10,000$$

$$\text{Utility} = \$30,000$$

So for an investment of \$10,000 dollars in training widget makers, the organisation can expect to receive \$30,000 profit through increased job performance over a one year period.

### **Question Period**

Were there any questions regarding the content of the video or the any other questions regarding this presentation?

If you could look now at the written material, I would appreciate if you could complete the reading and survey individually, as I am interested in your own personal perception and acceptance of the material. Please begin.



## **Reading and completion of written material and survey**

### **End of presentation**

Thank you all for your participation in today's research. As I have more presentations to complete, I would greatly appreciate if you did not discuss the material you viewed here until after today. At the completion of my research, the results will be available if anyone is interested in viewing them, please feel free to email me.

If there are no further questions or queries, thank you again for your assistance and I hope you all enjoy the rest of your day.

## Appendix G: COT Report

### Training Results Report

**Program:** Australian Institute of Sport (AIS) Short stay Camp

**Dates:** January 2006

**Participants:** 10 Physical Training Instructors

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The 2006 AIS Short Stay camp training program was very effective. Participants rated the program highly and indicated that the skills they learned had a significant impact on their job performance. Further, the program was instrumental in producing outcomes that far exceeded the cost of developing and implementing it.

The main goal of this program was to improve the ability Physical Training Instructors to deliver physical training that would ensure the physical readiness of RNZN personnel. Because responses came from individual contributors and managers in several different schools, the outcomes that they attributed to the application of skills learned in training were varied (e.g., increased range of physical activities, heightened personnel enjoyment, etc.).

To determine the financial value of the AIS Short stay camp, the business results of the program were analyzed. The overall financial value of a training program is approximately equal to the sum of the financial results attributed to the training program minus the costs. Each business result, or outcome, was reported by a participant in the program, verified by his or her manager, and assigned a financial value by an expert within the RNZN.

It is important to note that several training participants attributed outcomes to the program that could not be verified and/or assigned a financial value. While 4 PTI's noted that applying the skills learned at the camp allowed them to be aware of developments within coaching, leading to improvements in sporting levels (as measured by results from inter force sports), we were unable to assign a financial value to this result.

#### Results of the AIS Program

Listed below is a summary of business results attributed directly to the AIS Short Stay Camp.

<i>Business Results</i>	<i>Financial Results Equivalent</i>
Increased participation in team sports	\$15,000
Employee Retention	\$20,000
Serviceperson Fitness Improvements	\$50,000
<hr/> Total Financial Results	<hr/> \$85,000

This analysis shows that with 10 people trained, the approximate financial gain that was achieved was \$85,000 over a one-year period. Given that the total cost for implementing the program was \$50,000 the return on investment (ROI) of the AIS Short Stay program was approximately 170%, with a dollar value of \$35,000.

Detailed information regarding the calculation of the financial value of this training program is presented on page two of this report.

## TRAINING RESULTS REPORT – FINANCIAL VALUE CALCULATIONS

The chart below describes the types of outcomes that were attributed to the application of skills learned in the AIS camp. Also included are the number and type of respondents, their respective regions, and the outcome values. Further detail about each outcome is presented below the table.

Outcome Type	Respondents	Outcome Value	
Increased participation in team sports	15 Officers, 20 O/R's	Improved teamwork within the RNZN was valued by a focus group as \$15,000, resulting from the %25 increase in team sport participation.	
Employee Retention	Recruiting Officer	(4 Service Personnel retained) x (\$5,000 cost savings per employee) = total savings of \$20,000	
Service person Fitness Improvements	8 PTI's	Fitness test past rate 98%	Improved RNZN fitness determined by focus group to be worth \$50,000 per year.
	12 Officers	Fewer reports of fatigue related accidents	

### Increased participation in team sports

PTI have noted a 25% increase in organized team sports participation. They have attributed this to the PTI's passing on their new coaching knowledge onto team coaches, resulting in improved sporting results. Following this finding, a focus group was formed to determine the benefit to the RNZN of having more individuals in team sports. The consensus was that an economic benefit to the RNZN of \$15,000 was a conservative estimate.

### **Employee Retention Outcomes**

The Recruiting staff have noted that in the time since the AIS camp, no PTI have left, compared to two over the same period last year, also of the three personnel who were considered to be physically unfit to serve in the RNZN, 2 have made vast improvements in their physical condition and are no longer considered boarder line, a saving to the Recruitment budget of \$20,000. In comparison to the previous 3 months were 7 personnel left, only 3 have left in the three months following the PTI attendance at the AIS camp, while not directly attributable to the AIS camp, recruiting staff and feel that the AIS camp has been an influence on this.

### Serviceperson Fitness Improvements

Both officers and PTI have noticed an improved fitness level of service people in general, 10 individuals in the preceding three months before the ATI camp fell below the required fitness level, only 3 have fallen below the required level in the three months following the ATI camp. Given the benefits of an improved fitness level across the RNZN, a focus group (as used in the estimation of team sports) determined that \$50,000 was a conservative estimate.

## Appendix H: SUA Report

### Training Results Report

**Program:** Australian Institute of Sport Short stay Camp

**Dates:** January 2006

**Participants:** 10 Physical Training Instructors

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The 2006 AIS Short Stay camp training programs were very effective. Participants rated the program highly and indicated that the skills they learned had a significant impact on their job performance. Further, the program was instrumental in producing outcomes that far exceeded the cost of developing and implementing it.

The main goal of this program was to improve the ability Physical Training Instructors to deliver physical training that would ensure the physical readiness of RNZN personnel; the results of the program were analyzed. The model used to calculate this value was developed and refined by researchers over many years. These experts have concluded that the overall financial value of a training program is a function of the following:

1. The number of employees trained. (e.g., The greater the number of employees trained, the greater the potential return from the organization's investment in the training program).
2. The duration of the training program's effect on employee job performance. (e.g., A training program that improves job performance for six months will have less effect than a program that improves job performance for two years).
3. The difference in job performance as measured between a group of trained and untrained team members. (e.g., the larger the difference in job performance between employees who have been trained and those who have not, the higher the potential gain from the training program).
4. The dollar value of each unit of performance. (e.g., If a training program improves productivity, the financial value of the improvement must be estimated in order to compute the financial value of the training program).
5. The total cost of the training program. (This includes all costs associated with the training program including materials, equipment, facilities, travelling etc).

#### **Results of the AIS Program**

To calculate the dollar value of the program, estimates for each of the items described above were obtained through a study of job performance, analysis of the organization's records, and discussion with RNZN Personnel. This analysis shows that with 10 people trained, the approximate financial gain that was achieved was \$50,000 (after costs).

Given that the total cost for implementing the program was \$30,000, the return on investment (ROI) of the AIS Short Stay program was approximately 166%.

Detailed information regarding the calculation of the financial value of this training program is presented on page two of this report.

## TRAINING RESULTS REPORT – FINANCIAL VALUE CALCULATIONS

The calculation is as follows:

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

Where:

- $\Delta U$  = The dollar value of the training program.
- $T$  = The duration of the training program's effect on performance.
- $N$  = The number of persons trained.
- $d_t$  = The difference in performance between a trained and an untrained group on a measurement scale where 0 equals no difference and 1 equals a very large difference.
- $SD_y$  = %40 of annual salary of the position
- $C$  = The per person cost of the training program.

To compute the dollar value, input estimates for the terms in the model were obtained from the company's human resource records, surveys of managers, and best practice research regarding the effects of coaching skill building programs on employee performance. The input estimates are described below.

- 1) The average duration of coaching skills learned in training in similar organizations ( $T$ ) is 1 year;
- 2) The number of employees trained ( $N$ ) is 10;
- 3) The value of  $d_t$  was calculated to be 0.5.
  - a) This value was calculated by comparing the pre-training and post-training scores of Physical Training Instructors on their position performance evaluations.
- 4)  $SD_y$  is the Standard Deviation of Performance expressed in dollar terms. This is estimated by taking %40 of the annual salary of the position which the trainees are employed in. In this case the annual salary of Physical Training Instructors is \$40,000. Equating to an  $SD_y$  of \$16,000.
- 5) The total cost of the training program,  $C$ , is equal to the sum of the costs associated with developing and implementing the training program (e.g., development time, materials production and distribution, meals, travel, etc.). The total cost for the Australian Institute of Sport training program was \$30,000.

When these estimates are entered into the equation:

$$\Delta U = (1) \times (10) \times (0.5) \times (16,000) - 30,000$$

the dollar value gain as a result of the Australian Institute of Sport training program was approximately \$50,000.

## **Appendix I: CUA Report**

### **Training Results Report**

**Program:** Australian Institute of Sport Short stay Camp

**Dates:** January 2006

**Participants:** 10 Physical Training Instructors

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The 2006 AIS Short Stay camp training programs were very effective. Participants rated the program highly and indicated that the skills they learned had a significant impact on their job performance. Further, the program was instrumental in producing outcomes that far exceeded the cost of developing and implementing it.

The main goal of this program was to improve the ability Physical Training Instructors to deliver physical training that would ensure the physical readiness of RNZN personnel; the results of the program were analysed. The model used to calculate this value was developed and refined by researchers over many years. These experts have concluded that the overall financial value of a training program is a function of the following:

The number of employees trained. (e.g., the greater the number of employees trained, the greater the potential return from the organization's investment in the training program).

The duration of the training program's effect on employee job performance. (e.g., a training program that improves job performance for six months will have less effect than a program that affects job performance for two years).

The difference in job performance as measured between a group of trained and untrained team members. (e.g., the larger the difference in job performance between employees who have been trained and those who have not, the higher the potential gain from the training program).

The dollar value of each unit of performance. (e.g., If a training program improves productivity, the financial value of the improvement must be estimated in order to compute the financial value of the training program).

The total cost of the training program. (This includes all costs associated with the training program including materials, equipment, facilities, travelling etc).

#### **Results of the AIS Program**

To calculate the dollar value of the program, estimates for each of the items described above were obtained through a study of job performance and analysis of the organization's records. This analysis shows that with 10 people trained, the approximate financial gain that was achieved was \$50,000 (after costs).

Given that the total cost for implementing the program was \$30,000, the return on investment (ROI) of the AIS Short Stay program was approximately 166%.

Detailed information regarding the calculation of the financial value of this training program is presented on page two of this report.

## TRAINING RESULTS REPORT – FINANCIAL VALUE CALCULATIONS

To compute the dollar value, input estimates were obtained from the company's human resource records, surveys of managers, and best practice research regarding the effects of coaching skill building programs on employee performance. The input estimates are described below.

The average duration of coaching skills learned in training in similar organizations is 1 year;

The number of employees trained is 10;

The difference between pre-training and post-training scores of trainees on a performance test of coaching skills was 50% or 0.5.

The dollar value of a unit of improvement. This is estimated by taking %40 of the annual salary of the position which the trainees are employed in. In this case the annual salary of Physical Training Instructors is \$40,000. Equating to a unit of improvement being valued at \$16,000.

The total cost of the training program, is equal to the sum of the costs associated with developing and implementing the training program (e.g., development time, materials production and distribution, meals, travel, etc.). The total cost for the Australian Institute of Sport training program was \$30,000.

When these estimates are entered into the equation below:

Duration (1) x Participants (10) x difference between pre and post training scores x unit of improvement  
(16,000) – cost (30,000)

=

1 x 10 x 0.5 x 16,000 – 30,000

the dollar value gain as a result of the Time Management Skills training program was approximately \$50,000.

## **Appendix J: Decision-making scenario**

### Decision-Making Scenario

Imagine you are the Commanding Officer of the RNZN Training School; you have just received a report from the Organisational Psychologists on a training course, which ten RNZN Physical Training Instructors attended.

The report is a return on training investment report, compiled by RNZN Psychologists, as Commanding Officer of the Training School, it is up to you to decide whether the report contains the information you require to determine if the training program should be repeated in the future for the benefit of your future Physical Training Instructors, and if the information in the report is trustworthy.

The stated cost of the training program reflects all the costs associated with delivering the program, including: training materials and staff, travel and accommodation, trainee's salary, etc. The report outlines both the financial benefit to the organisation, from training these individuals, and the intangible benefits to the organisation. This *Return on Training Investment Report* follows on the next page. The content of the Australian Institute of Sport Short Stay training program is not described in more detail, as we are interested in your responses to the *Return on Training Investment Report*.

When you have finished reviewing the *Return on Training Investment Report*, please respond to the questions on the *Decision Making Survey*.



**Appendix K: Decision making survey**

All information reported on this form is **strictly confidential**. Please answer all the questions as completely as possible.

Gender: Male Female  
(Circle One)

Age: \_\_\_\_\_

Current Status within RNZN Officer Civilian  
(Circle One)

Total years of employment within the RNZN: \_\_\_\_\_

Years of experience as a Trainer (if any): \_\_\_\_\_

Years of experience as a Psychologist (if any): \_\_\_\_\_

Years of experience in Human Resources (if any): \_\_\_\_\_

Years of experience in Finance (if any): \_\_\_\_\_

*On the scale to the right, please mark the box with an 'X' that best represents your familiarity each of the following :*

1. Human Resource Accounting
2. Utility Analysis
3. Financial analysis of training programs
4. Analysis of Return on Investment (ROI), Return on Equity (ROE), Return on Sales (ROS)
5. Statistical analysis and reporting

Not Familiar		Somewhat Familiar		Very Familiar

In your assumed role of Commanding Officer, it is up to you to decide whether to implement the Australian Institute of Sport coaching program for future Physical Training Instructors.

Using the scale in the table below, please answer the following questions about your use of the information contained in the Training Results Report (i.e. the assessment report). There are no right or wrong answers. Please put an 'X' in the appropriate box.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I would use the information presented in this Training Results Report in deciding whether or not to implement this program.					
I am confident that I could justify my decision about whether or not to implement this program to my peers and/or superiors on the basis of the Training Results Report.					
I would recommend this type of Training Results Report to other RNZN units.					
Given the information in this Training Results Report, I would be very committed to implementing this program in the future.					
If this program were available to future RNZN service people, I would expect similar outcomes in terms of the results of training.					
If I were making decisions about whether to implement, or to continue using <i>other</i> training programs, I would ask to receive a Training Results Report like this one.					
This Training Results Report seems credible.					
This Training Results Report seems to be a reliable method of determining the value of implementing a training program.					
This Training Results Report seems trustworthy.					
I would have faith in this Training Results Report.					
I have confidence in the results of this Training Results Report.					
I found this Training Results Report understandable.					
I found the complexity of the formula used in the training report acceptable.					

Additional Comments

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## Appendix L: Content Analysis Exercise

### Research Overview

Return on training investment is a form of training evaluation, which seeks to calculate the financial benefit of a training program. The focus of this research was to investigate manager's acceptance of return on training investment calculations. Specifically the research investigated managers acceptance of training evaluation reports which were bases on return on training investment calculations. This investigation was carried out by presenting three return on training investment reports to senior Officers within the Royal New Zealand Navy. The three reports each provided a training analysis which focused on return on of return on training investment. The reports were presented to Senior Officers of the RNZN following a presentation on return on training investment, the Senior Officers were then asked to complete a survey which asked questions relating to their acceptance and perceived usefulness of the return on training investment reports. The final question of the survey was an open ended question, which asked for any additional comments which they might have on the research in general. The responses to the open ended question are the focus of this exercise.

A statistical measure called Fleiss' kappa, can be used to assess the agreement reliability between raters assigning a categorical rating to such items as comments from a survey. Fleiss' kappa is a two part measure, firstly the comments are grouped by individual raters into categories, and then the agreement between raters is calculated. The second part of Fleiss' kappa is achieved by having the raters meet, and discuss their assignment of comments to categories, at which time some changes in which comments have been assigned to which category as a result of rater debate.

### Analysis Instructions

The attached spreadsheet has two columns: column 'A' contains the comments received through an open question asked at the time of the research, while column 'B' contains repeated drop down boxes. The drop down box can be accessed by clicking in the cell (i.e. B2), at which time a small arrow will appear at the bottom right of the cell, by clicking on the arrow, the categories within the drop down box will appear. Please select the category, which best matches the overall comment in the adjacent cell (in column 'A;), and repeat for the remainder of the comments (the cells are shaded alternatively, to assist in visual presentation and ease of reading)..

	A	B	C
1	Comments	Main theme	
2	The report misses out how the effectiveness of the trained personnel was determined, i.e. reduction in the number of failures of fitness for service (paragraph 5 of report)		
3	Although not directly involved in training, I receive the trained output of the training school. My employment/trade is such that there is a significant attrition rate during training which means that currently there are two students remaining on a course that astarted with about 10. I would be interested to see how an analysis at the operational dunes transwer course stood up to scrutiny. I'm sure we would all be damed at the final cost per captia.	Issues with the report content Situational considerations Further information required Issues with the ROI equation or method Support for the ROI process/model	

In some cases a comment might contain several different themes within it, in this situation identify the key or overriding theme, and select the category which is the best fit

The categories have been pre-defined by a group which assisted in the research, and are as follows:

- **Issues with the report content**  
This category is for those comments which identify the participant had some reservations, questions or concerns with the report content.
- **Situational considerations**  
The category is for those comments which identify the participant as having some reservations, questions or concerns with how the return on training investment calculation/report would be used/implemented within the RNZN.
- **Further information required**  
This category is for those comments which identify the participant as requiring further information, or clarification of aspects of the report or return on training investment calculation.
- **Issues with the ROI equation or method**  
This category is for those comments which identify the participant as having some reservations, questions or concerns with the return on training investment calculation or method.
- **Support for the ROI process/model**  
This category is for those comments within which the participant provides support for the return on training investment calculation or method.

Once all comments have been assigned to a category, please email the completed spreadsheet back to myself at [brendan.lys@nt.gov.au](mailto:brendan.lys@nt.gov.au).

Thank you again for your assistance with this research

Brendan Lys