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Antecedents of training transfer

A case study of in-house courses at NCC, a Swedish construction and property development company

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Department of Applied Information Technology
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ABSTRACT

This study investigated work-related factors and trainee characteristics as antecedents of training transfer. The literature review identified seven factors as possible antecedents; self-efficacy, manager support, autonomy, time pressure, expected outcome, learning, and motivation to transfer. These factors were assessed using a quantitative questionnaire that was sent out to participants in the two courses *Partnering* and *Cost control* at NCC, a swedish construction and property development company. Correlation analysis demonstrated that self-efficacy, different kinds of manager support, learning, and motivation to transfer had a positive relationship to training transfer. Multiple linear regression modelling indicated that motivation to transfer is important to training transfer. These results are in line with previous research.

The survey research was complemented with interviews with enquirers of the two investigated courses. The purpose of the interviews was to capture NCC's goals and expectations of the outcome of the courses. When relating the results of the interviews with the results of the questionnaire, it seems like NCC's formal goals and expectations are met. The majority of the employees learn and transfer what they are supposed to. The enquirers' expectations of the courses are also in line with the employees'.

Keywords: Antecedents, training, transfer, motivation to transfer, self-efficacy, learning, manager support.

ACKNOWLEDGEMENTS

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Many thanks also to my statistical supervisor Johan Tykesson who guided me through the jungle of statistical tests and gave me advice regarding tests and analysis appropriate for this study. I would also like to send my appreciation to Christian Rosenhamer at NCC for bouncing ideas with me and helping me with concretizing them, and my friend Daniel Ström for verifying and revising the translation of the questionnaire items.

Lastly, great thanks to Axtell, Maitlis & Yearta (1997) and Maurer, Wiess and Barbeite (2003) for giving me permission to use their instruments in my survey.

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1. INTRODUCTION

Our world is in constant change and organisations are operating in markets that are becoming more global, more competitive and more technology based (Maurer & Tarulli 1994). These changes in the market probably compel changes in the workplace as well (Liao & Tai 2006). In order to meet the new challenges, organisations have to increase their skill demands on employees (Maurer & Tarulli 1994), which makes it necessary for employees to be flexible and adaptable (Liao & Tai 2006).

For organisations to be competitive in this changing environment, training of employees is being recognised as a critical measure (Maurer & Tarulli 1994). Given the important role training is perceived to have for organisational effectiveness, it is essential that training programs are designed and implemented to be as effective as possible (Facteau, Dobbins, Russell, Ladd & Kudisch 1995).

Many researchers have pointed out the fact that work-related training often seems to render poor results (eg. Holton, Bates, Bookter & Yamkovenko 2007; Gegenfurtner, Veermans, Festner & Gruber 2009; Hutchins, Nimon, Bates, & Holton 2013; Renkema 2006). Holton et al. (2007) state that many professionals in human resource development do not have an accurate sense of what the problem really is. However, Hutchins et al. (2013) offer one way to understand it by declaring that employees seldom manage to translate newly acquired skills and knowledge to improvement of job performance.

In order to improve the effect of training programs, it is important to identify and understand the factors influencing the outcomes of training (Facteau et al. 1995) and to measure the outcomes (Chiaburu & Marinova 2005). Previous research has demonstrated that transfer of training, from knowledge and skills to job performance, is intricate and dependent on several factors (Holton, Bates & Ruona 2000). Many of the researched factors are linked to the design and implementation of training (Holton et al. 2000), but the work environment and trainee characteristics have also proved to influence training transfer (eg. Colquitt, LePine, & Noe 2000; Axtell, Maitlis & Yearta 1997). This study will focus on trainee characteristics and factors in the work environment that influence training transfer, rather than design and implementation factors.

1.1. Aim of current study

The purpose of this study is to contribute to the research about possible training transfer antecedents. To achieve this, the study examines the participating employees' and the enquirers' intentions with work-related training and how these intentions affect the learning transfer of the participants.

The goal of the study is to provide the answers to the following research questions (RQs):

RQ1 When trainees return to work from training, which are the antecedents of training transfer, other than course characteristics?

RQ2 What outcome do trainees expect from participation in a course and how does that affect their perceived training transfer?

RQ3 Is the learning and transfer of a course the one that the enquirer expected?

RQ4 How do the traniees' expectations of the outcome of a course relate to the enquirers'? Do they reinforce or counteract each other?

The discussion, section XXX, will include a reflection on how NCC will be able to use the answers to the research questions to improve the transfer of their work-related training.

1.2. Delimitation

When doing a quantitative study of factors influencing training transfer, the choice of what factors to include has to be made. This means that there will always be other possible antecedents of training transfer that are not included in the study. Please refer to section *3.4.1 Method*, where the method of the survey is explained, for more information about the consequences of excluding possible antecedents.

Furthermore, the study focuses on antecedents to training transfer and training transfer itself. It does not investigate the consequences of training transfer, such as organisational benefits from training transfer.

1.3. Brief description of method

The method consists of three parts - a review of literature and previous research, a quantitative survey research of participants' intentions and a qualitative interview study. The goal of each part is described briefly below. For a more detailed description about the survey and the interviews, please refer to the methodology section of each part, section *3.4.1* for the survey and section *3.5.1* for the interviews.

The literature review aims to give an overview of previous research of the field and provide factors that, according to previous research, might or should affect the learning and transfer of training. These factors will then be investigated in the survey research.

The quantitative investigation of the chosen factors will be a descriptive and non experimental survey research using a questionnaire. The dependent variable used will be transfer of training and the independent variables will be chosen from the literature review, as noted above. The data from the questionnaire will be analysed using the software SPSS Statistics.

Since the enquirers are much fewer than the participants in a course, a quantitative study is not applicable when investigating the enquirers' intentions and expectations. Instead interviews will be held to capture the intentions and expectations of the enquirers.

1.4. Thesis outline

The first chapter of the thesis is a literature review, which aims to provide a common understanding of the training process, different antecedents and definitions of terms that will be used in this thesis. The review leads up to the choice of factors to investigate as antecedents of training transfer in this study and ends with describing the theory behind the statistical tests used to analyse the questionnaire data.

Even though it is custom to keep the method separate from the rest of the thesis by presenting a method's chapter, I have chosen to present the method and results for each part of the research seperately in a chapter called Case study. In this chapter both the survey and the interviews are presented.

The last two chapters in the thesis are Discussion, including limitations, recommendations for NCC and suggestions for future research, and conclusion. In the appendices the questionnaire in swedish, the manuscript for the interviews and permissions to use material from other researchers can be found.

2. LITERATURE REVIEW

This literature review has three main tasks to fulfil. Firstly, it is supposed to present previous research in order define terms used in the thesis and provide a common understanding if the training process. Secondly, the choice of factors to include in this study is explained and the outcome presented. And lastly, the theory behind the statistical tests used in the analysis of the questionnaire data and how the results should be interpreted are described.

2.1. Work-related training

A good place to start this literature review is by answering the question "What is work-related training?". Noe (1986, pp. 736) defines training, by citing Campbell, Dunnette, Lawler & Weick (1970), as "a planned learning experience designed to bring about permanent change in an individual's knowledge, attitudes, or skills". This definition of training corresponds with Kyndt & Baert's (2013) description of formal learning. They mean that formal learning happens in a context which is specifically designed for learning. Combine the two and one could say that training is an activity designed for the purpose of formal learning.

The training can be designed and implemented by the organisation on their own account or by a separate training institute, and take place in the workplace as well as at a different location (Kyndt & Baert 2013). With this definition of training, it is possible for an employee to seek, find and participate in work-related training that was *not* arranged or ordered by the organisation. However, in this study the focus is on work-related training that *was* arranged or ordered by the organisation.

Henceforth, the word training will refer to work-related training as defined above.

2.1.1. How do organisations benefit from training?

Even though many researchers have pointed out problems and failures in training (e.g. Gegenfurtner et al. 2009; Renkema 2006), many organisations continue to expand their training of employees. It seems like organisations at least believe that they benefit from training, which raises the question about organisational outcomes from training. Owens (2006) investigated some possible benefits from training and reached the conclusion that training could lead to higher job satisfaction among employees, higher organisational commitment and less turnover cognitions. The meta-analysis done by Tharenou, Saks & Moore (2007) demonstrated a positive distinct relationship between training and organisational performance, but the relationship between training and financial outcomes was very weak.

2.1.2. The training process

In this section the general process of training will be discussed, or in other words this section will try to answer the question "What are the steps from employees' intention to participate in

training to organisational outcome?". A conceptual, summarising model of the training process based on previous research results and models will be introduced.

There are a lot of research focusing on different and separate parts of the process (examples will be given shortly), but to my awareness research regarding the process as a whole is scarce. Therefore, it is not obvious where to start when describing the process of training. Wherever the starting point is, there are likely several antecedents to that starting point, which means that the starting point is simply a matter of decision. The chosen starting point in this review is the employees' intentions to participate in training, henceforth called intention to participate.

Research examining intention to participate or participation in training have often used Ajzen's (1991) theory of planned behaviour as a framework to describe and investigate relationships between intention, participation and different antecedents (e.g. Hurtz & Williams 2009; Renkema 2006). The theory of planned behaviour is a model used to predict the behaviour in a specific situation. The behaviour is predicted by the intention to act according to the behaviour and the intention is predicted by the attitude towards the behaviour, the subjective norm and perceived behavioural control (Ajzen 1991), as illustrated in Figure 2.1. The positive relationship between intention to participate and participation has been demonstrated in research (e.g. Kynd & Baert 2013).

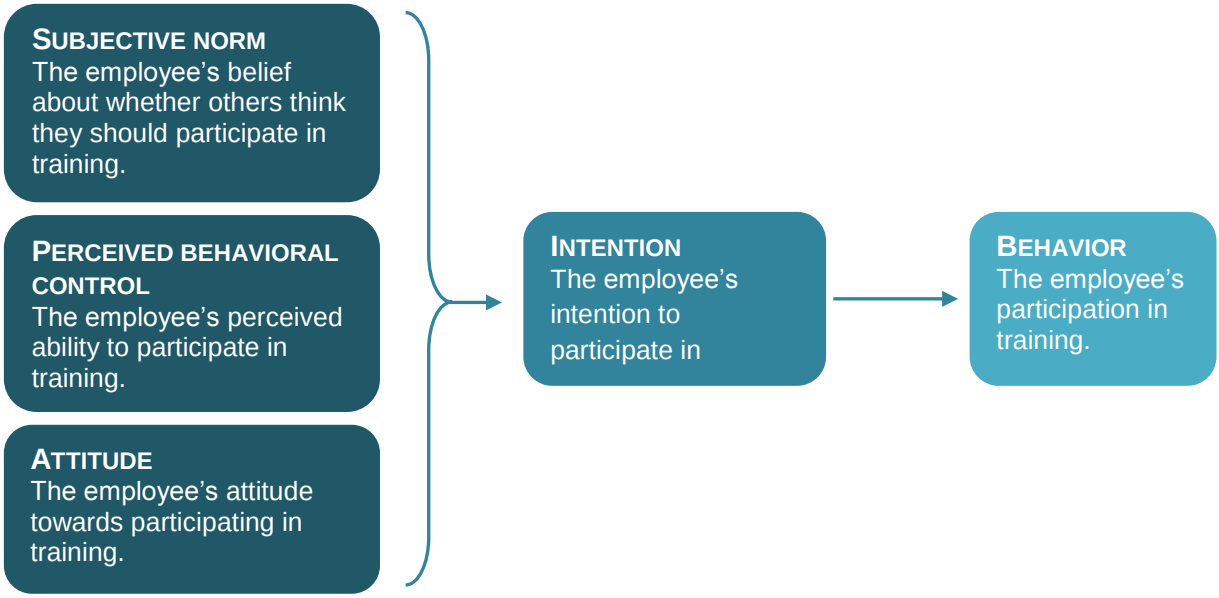


Figure 2.1 Model of theory of planned behaviour with explanations of how it could be used in the setting of training.

After the employee has participated in training, there are different kinds of possible learning outcomes. Many researchers use Kirkpatrick & Kirkpatrick's (2006) model of training outcome to evaluate the effects of training (Kraiger 2003). The model is hierarchical, meaning that the first step has to be achieved before the next. The levels of outcomes according to the model are as follows:

Reaction → Learning → Behaviour → Results

Reaction refers to how the employee reacted to the training and learning refers to newly acquired knowledge (Kirkpatrick & Kirkpatrick 2006). If learning took place it is possible for the employee to change his or her behaviour in order to use new skills and knowledge at work. The last step of the model refers to the results of employees changing their behaviour, such as safer work environment or time savings.

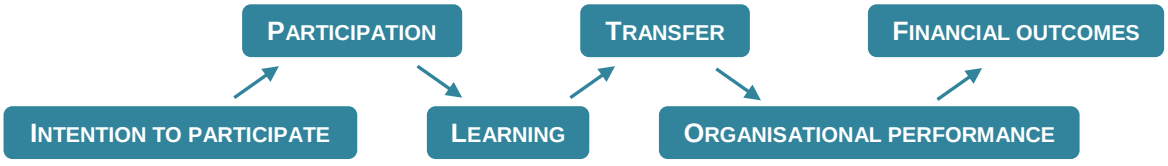
Despite the fact that Kirkpatrick & Kirkpatrick's (2006) model of training outcomes is well-accepted among organisations and researchers it has been criticised for being overly simplistic and unidimensional (Kraiger 2003). Some researchers found no relationship between reaction and learning (e.g. Colquitt et al. 2000). Kraiger (2003) explains that it is possible for employees to learn even if they did not like the training, that is even if their reaction to the training was bad.

Noe (1986) uses a model of training outcomes that is very similar to the model discussed above. The only difference is that Noe (1986) does not include reactions and has changed the word behaviour to behaviour change. Colquitt et al. (2000) also excluded reactions from their model, and used the word transfer instead of behaviour.

But what about the organisational outcomes? So far in this review, no organisational outcomes have been included in the models presented above. Holton et al. (2000) do so in their model used to evaluate training outcomes. The model is called Learning Transfer System Inventory (LTSI) and was based on results from previous research. The training outcomes included in LTSI are learning, individual performance and organisational performance.

Lastly, Tharenou et al. (2007) add one more outcome after organisational performance, namely financial outcomes.

The model presented in Figure 2.2, summarises the theories and models presented above. Since the research is equivocal when it comes to reactions to training, reactions have been excluded. The purpose of the model is to give a mutual understanding, between author and reader, of the general training process as a whole. It also provides the terminology that will be used in this thesis.



2.1.3. Antecedents of training transfer

The above presented, conceptual model of the training process is a very generalised description of the process. Of course there are many other antecedents to each step not

Figure 2.2 Model of the training process.

included in the model. For example, research has demonstrated that participation could be predicted by attitude, self-efficacy and expected benefits (Kyndt & Baert 2013; Maurer, Weiss & Barbeite 2003) and that learning outcome correlates with motivation to learn and self-efficacy (Colquitt et al. 2000). Although, since the focus of this thesis is training transfer, only antecedents of training transfer will be discussed here.

Antecedents of training transfer has been categorised in different ways. Kraiger (2003) use the categories organisational-level, social- or team-level and individual-level antecedents, whereas Colquitt et al. (2000) divide the antecedents into individual and situational characteristics. A frequently used classification, which is also the classification that will be used in this thesis, is trainee characteristics, course characteristics and environmental factors. Axtell et al. (1997), Gegenfurtner et al. (2009) and Baldwin & Ford (1988), all use this classification with slight changes in the choice of terminology.

2.1.3.1. Trainee characteristics

One very well-researched antecedent of training transfer is trainees' motivation. A lot of research has demonstrated a positive correlation between training transfer and different kinds of motivation. For instance, training transfer has been shown to have a positive relationship to motivation to transfer (Axtell et al. 1997), pre-training motivation (Chiaburu & Marinova 2005; Facteau et al. 1995) and motivation to learn (Colquitt et al. 2000).

Other trainee characteristics that could predict training transfer are organisational commitment and self-efficacy (Colquitt et al. 2000). Organisational commitment refers to how committed the trainee is to the organisation, that is the trainee's involvement in and identification with the organisation (Colquitt et al. 2000). Self-efficacy means the trainee's beliefs in his or her own ability to finish the training with good results, see section *2.1.4.1 Self-efficacy* for a more detailed definition.

2.1.3.2. Course characteristics

When it comes to learning and teaching it is widely agreed that the way in which the training is implemented influences the learning (Holton et al. 2000), and in extension the transfer (Colquitt et al. 2000). An example of course characteristics, or training-related characteristics as Gegenfurtner et al. (2009) put it, are perception of relevance and usefulness. Axtell et al. (1997) demonstrated that if the trainee perceived the training as relevant and useful, he or she is more likely to transfer skills and knowledge acquired in training to the job.

2.1.3.3. Environmental factors

Even if the training was excellently implemented and the trainee was highly motivated to transfer knowledge and skills to workplace, factors in the work environment might still prevent the trainee from transferring (Axtell et al. 1997). In this study, these factors are called

environmental factors and refer to the trainee's perception of his or her environment, such as perceived support from colleagues or if the organisational culture is perceived to encourage learning and development, Supervisor support (Colquitt et al. 2000), autonomy (Axtell et al. 1997) and peer support (Colquitt et al. 2000; Facteau et al. 1995) are examples of environmental factors that influence training transfer. Top management support does not influence training transfer, according to the study made by Facteau et al. (1995).

2.1.4. Choice of factors to examine

When choosing antecedents of training transfer to include in this study, two things were considered: 1) frequently researched antecedents, 2) whether there was a suitable study to replicate. In this case, a suitable study means a study that investigates as many antecedents as possible from 1) and 2) and that uses a quantitative survey with a sample size not larger than 300 respondents.

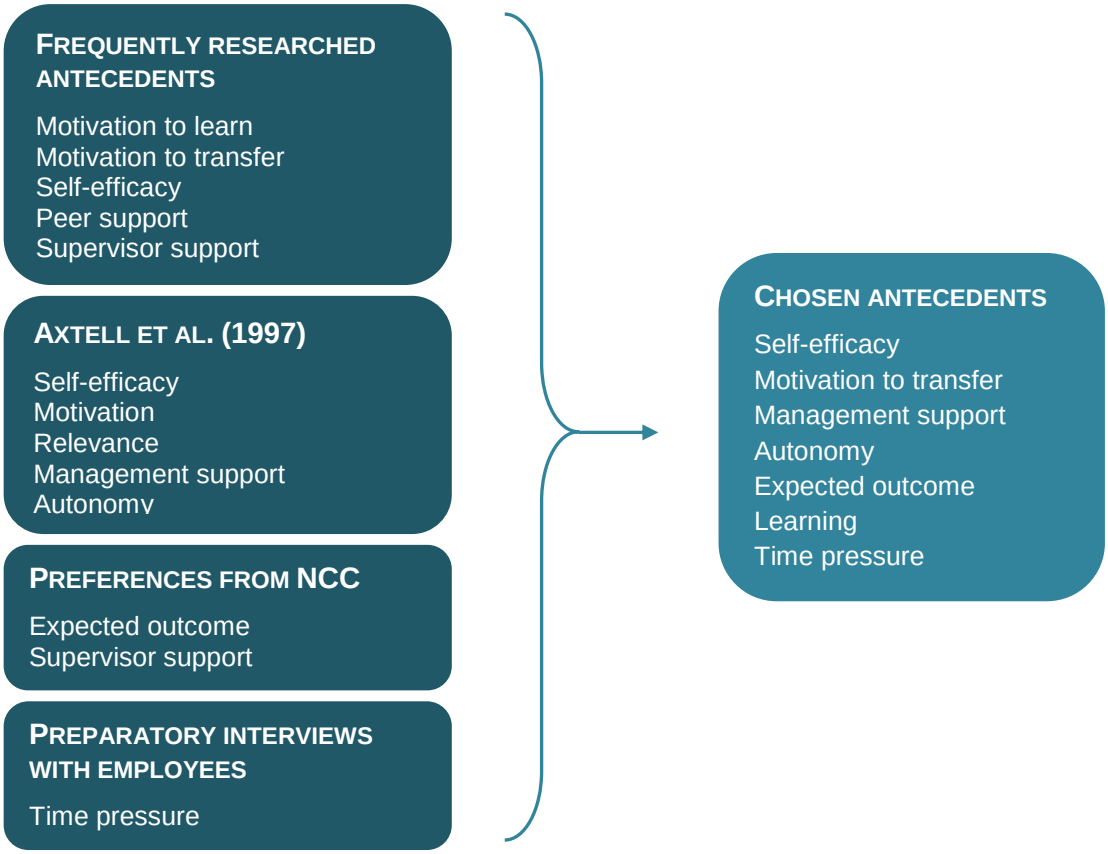


Figure 2.3 The chosen antecedents to include in this study.

Figure 2.3 lists some frequently researched antecedents and antecedents from the chosen study, namely Axtell et al. (1997), to the left, and to the right the resulting antecedents that will be studied in this thesis can be found. Expected outcome was added according to preferences from NCC, and time pressure was included due to the result of preparatory, informal interviews with employees. Since several employees identified and emphasized pressure and lack of time as the main inhibitors of training transfer, the relationship between time pressure and transfer seemed interesting to study. The chosen antecedents will be defined and described below.

2.1.4.1. Self-efficacy

Generally, self-efficacy refers to the belief in one's own ability, but it has been divided into different kinds of self-efficacy and defined more precisely by many researchers. For instance, Maurer et al. (2003) use the term development self-efficacy, which they define as the belief in one's capability to improve and develop career-relevant competencies. Al-Eisa, Furayyan & Alhemoud (2008) defines two different kinds of self-efficacy, namely pre-training self-efficacy and post-training self-efficacy. Pre-training self-efficacy is the confidence in one's ability to learn, while post-training self-efficacy refers to the confidence in one's ability to transfer. In this study, self-efficacy will refer to the definition used in Axtell et al. (1997), which is the same as post-training self-efficacy as defined by Al-Eisa et al. (2008).

Employees with higher levels of self-efficacy are more likely to have positive expectations about and be better prepared for training, than employees with less self-efficacy (Al-Eisa et al. 2008). In extension, the employees with more self-efficacy are more likely to be motivated to look for opportunities to learn and to transfer. With this in mind, it feels plausible that self-efficacy would be a predictor of training transfer.

Self-efficacy has been demonstrated to influence several phases of the training process illustrated in the model of the training process, see Figure 2.2. Participation (Kyndt & Baert 2013; Maurer et al. 2003), learning (Kyndt & Baert 2013; Colquitt et al. 2000) and pre-training motivation (Chiaburu & Marinova 2005) all correlate with self-efficacy. Self-efficacy has also been shown to influence training transfer, although the research on whether the relationship is direct or mediated by motivation is equivocal (Axtell et al. 1997; Colquitt et al. 2000).

2.1.4.2. Manager support

Another well-researched antecedent of training transfer is management support, or supervisor support. Supervisors can influence training transfer positively or negatively by supporting or preventing transfer (Holton et al. 2007). For example, managers can support training transfer by encouraging employees to use acquired knowledge and skills (Axtell et al. 1997), by providing technical support (Kraiger 2003) and by tolerating mistakes (Axtell et al. 1997).

Supervisor support has been demonstrated to positively influence training transfer (e.g. Colquitt et al. 2000). It also correlates with motivation to learn (Colquitt et al. 2000; Facteau et al. 1995), learning outcome (Al-Eisa et al. 2008; Colquitt et al. 2000) and participation in training (Kyndt & Baert 2013; Tharenou 2001).

2.1.4.3. Autonomy

Autonomy refers to the extent to which trainees have control and responsibility over their work situation (Axtell et al. 1997). Employees with high levels of autonomy can decide how to carry out their work assignment and have the possibility to be flexible.

To my knowledge, the term autonomy has only been used as a transfer antecedent by Axtell et al. (1997), but other similar factors have been researched, such as the organisational environment's openness to change (Hutchins et al. 2013).

2.1.4.4. Expected outcome

Many different terms have been used to describe trainees' expectations of the outcomes of training. Noe (1986) use the word valence for trainees' preferences among training outcomes such as promotion and recognition. Maurer & Tarulli (1994) and Facteau et al. (1995) both differentiate between extrinsic and intrinsic expectations, but Maurer & Tarulli use the word outcomes while Facteau et al. use the word incentives. The current study will use the terms expected intrinsic and extrinsic outcomes.

Maurer & Tarulli (1994) used three kinds of perceived outcome - extrinsic, intrinsic and psychosocial. Factor analysis later showed that merging intrinsic and psychosocial outcomes would fit the research data better, which resulted in the two factors extrinsic outcome and intrinsic-psychosocial outcomes (Maurer et al. 2003). Extrinsic outcomes is related to rewards that the trainee perceive is likely to come from training. Intrinsic-psychosocial refers to the extent to which trainees believe that work will be more interesting or stimulating and that one will be a better person overall after training.

Expected outcome, and differently put but similar antecedents, has been demonstrated to influence participation in training (Maurer & Tarulli 1994; Kyndt & Baert 2013;Maurer et al. 2003), pre-training motivation (Facteau et al. 1995), motivation to learn (Colquitt et al. 2000) and transfer of training (Colquitt et al. 2000).

2.1.4.5. Time pressure

Time pressure as an antecedent of training transfer seems to be a poorly researched factor. Despite many hours of searching, I have failed to find research where time pressure is investigated as a possible antecedent of training transfer. However, many researchers have investigated other factors which one could argue that time pressure is part of, such as the environment's openness to change (Hutchins et al. 2013), the trainees' opportunity to use new skills (Hutchins et al. 2013) and organisational culture (Gegenfurtner et al. 2009). Axtell et al. (1997) included time pressure in their collection of data, that is in their questionnaire, but excluded said factor from their article[1]. The reason for the exclusion is to me unknown.

Even though the question whether time pressure is an antecedent of training transfer or not remains, the factor is included in this study. As mentioned above, the reason for doing so is that the preparatory, informal interviews with employees indicated that time pressure might be one of the main inhibitors to training transfer.

2.1.4.6. Motivation to transfer

There are three forms of motivation frequently used in training research, that seem to be conceptually consecutive, as demonstrated below (Al-Eisa et al. 2008):

Motivation to train → Motivation to learn → Motivation to transfer

An employee who is highly motivated to train, which refers to the employee's desire to participate in training (Al-Eisa et al. 2008), is expected to be more motivated to learn, that is

[1] Carolyn Axtell, in an e-mail conversation the 14th of January 2015.

their desire to learn the content of training (Noe 1986). In turn, employees that are motivated to learn would likely **demonstrate** the desire to use the knowledge and skills acquired in the training program in the work place. That desire is called motivation to transfer (Axtell et al. 1997; Al-Eisa et al. 2008). The positive relationship between motivation to learn and motivation to transfer has also been demonstrated in research (Gegenfurtner et al. 2009).

To better understand different kinds of achievement motivation, which includes both motivation to learn and motivation to transfer, many models and theories about motivation have been developed. Colquitt et al. (2000) bring up two groups of motivation theories - need-motive-value theories and expectancy-value theories. The first group of theories use differences in personality, values and motives to explain variations between individuals' motivation, whereas the second group looks to individuals' preference in outcome (values) and their belief that they will achieve the training objectives (expectancy).

Eccles and her colleagues presented an expectancy-value model of achievement motivation (Eccles & Wigfield 2002) and their model has been frequently used to define, describe and investigate motivation to learn and motivation to transfer (e.g. Colquitt et al. 2000). The model includes two levels of antecedents to achievement motivation, where performance and persistence are assumed to be directly influenced by expectancies and values. In turn, expectancies and values depend on, for instance, trainees' perceptions of one's competence and perceptions of task difficulty.

Some of the factors included in the above described models of motivation, have been researched and demonstrated to influence motivation to learn or motivation to transfer. Motivation to learn could be influenced by valence and self-efficacy (Colquitt et al. 2000), which could be compared to values and expectancies. Personality traits, expectancies and self-efficacy are some antecedents of motivation to transfer (Gegenfurtner et al. 2009).

When it comes to research regarding antecedents of training transfer, researchers are not in agreement on whether achievement motivation has been identified as an important antecedent of training outcomes or not. Al-Eisa et al. (2008) assert that a substantial body of research has demonstrated that motivation to learn is crucial for training effectiveness, whereas Colquitt et al. (2000) mean that due to inconsistent results and use of methods the research on achievement motivation is not coherent. Still, training motivation is a well-researched field and many studies have concluded that motivation influences training outcomes (e.g. Franke & Felfe 2012; Gegenfurtner et al. 2009). Hutchins et al. (2013) concluded that motivation to transfer has the strongest relationship to intent to transfer of all the 16 investigated factors and the study made by Colquitt et al. (2000) showed that motivation to learn explained more of the variation in learning than did cognitive ability. However, the way in which motivation affects the training outcomes remains unclear.

Some research have successfully investigated motivation as an antecedent just like the other ones (e.g. Axtell et al. 1997; Franke & Felfe 2012), whereas other studies have used motivation as a mediator between other antecedents and training outcomes (eg. Al-Eisa et al. 2008; Chiaburu & Marinova 2005). The research of Colquitt et al. (2000) investigated two

different models where the effects of other factors on learning were partially or completely mediated by motivation to learn. The partially mediated model fit the data better.

This study will examine motivation to transfer as a non-mediating antecedent to training transfer.

2.1.4.7. Learning

There are many different ways to define learning. Gärdenfors (2010) addresses two questions that a definition of learning needs to answer - who or what will be learning and what is the purpose. In the field of employee training, the term learning organisation is often used. Here the object that does the learning is the organisation itself. Another possible point of view is neurons as the learning object, but in this study we will focus on what Gärdenfors (2010) calls individual learning, or in other words, the employees' acquisition of skills and knowledge presented in the training (Liao & Tai 2006).

The purpose of learning could either be the personal development of the learning individual or a wider perspective such as long-term benefits for the community (Gärdenfors 2010). When it comes to training in organisations the main purpose of the learning is organisational benefits.

Measuring learning can be problematic, since, as BusinessDictionary (2015-02-27) explains it, learning itself cannot be assessed. Instead the results of learning are often measured, for instance by tests or observations of behaviour. In this study, the problem with measuring learning is solved by investigating perceived learning instead of actual learning. Instead of trying to assess the learning from a course by tests, employees are asked about their perception of their own learning.

To summarize, learning in this study refers to the employee's perception of to which extent one has acquired the skills and knowledge presented in the training.

2.1.4.8. Transfer

Transfer of training is defined as the process where the trainees continuingly apply skills and knowledge acquired in training to their jobs (Kraiger 2003). Holton et al. (2007) give the term a wider definition by adding the actual acquisition of knowledge and skills and the application of knowledge and skills in situations that were not targeted in training as well. In the current study transfer of training, or training transfer, will refer to all application of new skills and knowledge to work-situation whether or not they were targeted in training. The acquisition of skills and knowledge will not be regarded as included in training transfer, but rather in learning.

In training research, training transfer is generally used as the dependent variable (e.g. Axtell et al. 1997; Colquitt et al. 2000). In other words, research usually investigates antecedents to training transfer rather than consequences and outcomes of training transfer. Of course there are exceptions, such as Tharenou et al. (2007) who examine organisational outcomes of training transfer.

2.2. Statistical analysis

Even though it is not custom, the theory that is necessary to understand the statistical analysis in this study, is presented as a service to the reader who are not acquainted with statistics. First, a couple of useful terms are defined and described briefly. This is followed by the theory behind the statistical tests that were used in the analysis of the survey data, as well as the conditions that need to be met in order to use the tests and short instructions on how to interpret the test results.

2.2.1. Terms used

For the reader who is unacquainted to the field, some of the terms used in the following sections are defined and described within the context of statistical analysis and questionnaires:

Variable	A variable is often associated with a single question in a questionnaire, but can also be created based on other variables. Variables take different values for different respondents (Araï 1999) and can be categorised into dependent/independent variables (Morgan, Leech, Gloeckner & Barrett 2004).
Item	An item is the conventional term for a question in the questionnaire. Each item corresponds to one variable. But, as mentioned above, one variable does not necessarily correspond to one item, since variables can be created based on other variables.
Scale	A scale is a set of items measuring different aspects of the same construct. An example is the construct "Attitude to traffic" where the scale could include the item "Do you try to avoid rush hours when driving?". Please note the difference between scale and measurement scale.
Measurement scale	The term measurement scale refers the values which an item can take. For example age can be measured in whole years or in intervals of ten years.
Factor	The word factor is used in the same meaning as above, the chosen factors to investigate in this study. Each factor corresponds to one or more scales. In other words, scales are used to measure factors.
Index	To analyse and interpret the data it is helpful to create one single variable for each factor. This is what indexes are used for. The index is the sum of the values of the scale items for each individual. In other words, an index is the value of the corresponding scale.

2.2.2. Level of measurement

When choosing what statistical tests to use in the analysis, it is important to be aware of what kind of data has been collected. This goes the other way to - it is important to collect the kind of data that is needed to carry out the analysis that will answer the research question. The way of measuring the objects will collect different kind of data. In statistics the conventional expression would be that the data will have different levels of measurement depending on the data collection method, or rather the measurement scale. The level of measurement then determines what statistical tests are appropriate to use.

In order to properly understand the choices, motivations and explanations in this study the reader needs to be familiar with the different levels of measurement. This section provides some basic knowledge in the field.

Even though there are different ways to categorize data into levels of measurement (Morgan et al. 2004), the four levels explained by Djurfeldt, Larsson & Stjärnhagen (2003) and Araï (1999) seem to be the most common.

Araï (1999) use the terms ranking, equidistance and absolute zero to differentiate between the four levels of measurement. Ranking refers to whether the data can be ranked in a meaningful way, equidistance means that the differences between any two subsequent values on the measurement scale are equal and if a measurement scale has an absolute zero it means that there is a zero in the scale, but no negative values. In Table 2.1 these terms have been used to explain the four levels of measurement.

	RANKING	EQUIDISTANCE	ABSOLUTE ZERO
Nominal	No	No	No
Ordinal	Yes	No	No
Interval	Yes	Yes	No
Ratio	Yes	Yes	Yes

Table 2.1 Levels of measurements and their properties (Araï 1999).

As Table 2.1 shows, nominal data has neither ranking, equidistance nor absolute zero. This means that nominal measurement scales are just classifications of objects. Gender and occupation are examples of nominal data. Since the data cannot be ranked no arithmetic operations such as subtraction, addition, multiplication or division provides any meaningful results, instead one should focus on, for instance, frequencies and mode in the analysis (Djurfeldt et al. 2003).

The next level of measurement is ordinal data. Ordinal data can be categorised and ranked in a meaningful way, but does not have equidistance or absolute zero. Because of the lack of equidistance, arithmetic operations with the values are not meaningful (Warner 2013), but arithmetic operations with the objects internal ranking as input could be. Attitudes are usually measured with ordinal scales with response alternatives such as “Strongly disagree”, “Disagree”, Agree” and “Strongly agree”.

Interval data has ranking and equidistance, but not an absolute zero. Temperature measured in Celsius serves as an illustrative example. The distance between two subsequent values are the

same regardless of the size of the values, but since there are negative values the scale has no absolute zero, which implies that it would not be correct to say that 10°C is twice as warm as 5°C. This also means that addition and subtraction is possible, but not division and multiplication (Warner 2013).

The last level of measurement is ratio. Ratio data has ranking, equidistance and an absolute zero. Examples are weight, length and time. Addition, subtraction, division and multiplication provides meaningful results and all kind of statistical tests can be done with ratio data.

Table 2.2 summarizes what arithmetic operations can be used with each level of measurement and gives examples of statistical calculations appropriate to use. Please note that the methods for lower levels of measurement can be used with higher levels as well.

	ARITHMETIC OPERATION	EXAMPLE OF STATISTICAL TEST
Nominal	=, ≠	Frequencies, mode
Ordinal	<, >	Ranks, median
Interval	+, -	Means
Ratio	×, ÷	Means

Table 2.2 Appropriate arithmetic operations for each level of measurement (Warner 2013; Morgan et al. 2004).

2.2.3. Spearman Rank-Order Correlation Coefficient

One way to determine whether there is a relationship between two variables is to investigate the correlation between the two (Dodge 2010). There are many different correlation coefficients to use, depending on for instance level of measurement, but all of them have some characteristics in common. They all range from -1 to 1 and the interpretation of the size of the coefficients is the same (Dodge 2010). A positive correlation coefficient means that if one of the investigated variables increase, the other tends to do the same, whereas a negative correlation coefficient means that if one of the investigated variables increase, the other tends to decrease (Araï 1999). A correlation coefficient that is close to zero indicates that there is no relationship between the two variables (Dodge 2010).

If the investigated variables are ordinal, it is common to use the correlation coefficient Spearman rank correlation coefficient (Araï 1999), also called Spearman's rho (Corder & Foreman 2009). As noted in section 2.2.2 *Level of measurement*, it is not sensible using arithmetic operations on the values of ordinal data. Spearman rank correlation coefficient instead uses the rank of each value, see the formula in Equation 2.1. If several values have the same rank, the average rank of these observations will be used (Dodge 2010).

$$r_s = 1 - \frac{6\sum d_i^2}{n(n^2-1)}$$

Equation 2.1 Spearman rank-order correlation coefficient, where n is the number of objects, and d_i is the difference between the rank of each pair (Djurfeldt et al. 2003).

The conditions that need to be met in order to appropriately use the Spearman rank correlation coefficient are (Morgan et al. 2004):

- The level of measurement of both variables is at least ordinal.

- The values of the variables are monotonically related, which means that the curve of the relationship between the variables should be only increasing or decreasing, not both.

There are two important things to note about Spearman rank correlation coefficient. Firstly, since the Spearman rank correlation coefficient is not based on a linear scale, expressions like "r=0.8 is twice as strong as r=0.4" would be wrong (Corder & Foreman 2009). Secondly, it is easy to confuse correlation with cause-and-effect relationships. In order to be able to say that A causes B, there are three criteria that need to be met; 1) A comes before B in time, 2) A has a significant correlation to B and 3) there is no other factors that causes the correlation between A and B (Muijs 2004). Correlation analysis can only check the second criterion. In other words, the fact that two variables are correlated does not necessarily mean that one of them is the cause of the other (Araï 1999).

2.2.4. Cronbach's alpha

Cronbach's alpha, the most frequently used reliability coefficient in organisational research (Cho & Kim 2014), indicates the extent to which a test or scale measures the same construct or attribute (Colman 2014a). In other words, coefficient alpha is used to assess internal consistency of items within a test (Morgan et al. 2004).

$$\propto = \frac{k}{k-1}\left(1 - \frac{1}{s^2}\sum_{i=1}^{k} s_i^2\right)$$

Equation 2.2 Cronbach's alpha, where k is the number of items, s is the variance of the total test scores, and s_i is the variance of item i (Upton & Cook 2014).

The formula of Cronbach's alpha, as defined in Equation 2.2, might be hard to grasp. Another way to see it, which is mathematically equivalent to the formula (Colman 2014b), is that if we split the test or scale in half in every possible way, alpha would be the average of the correlation coefficients between each pair of halves.

Cronbach's alpha usually ranges from 0 to 1 (Tavakol & Dennick 2011). If the items in the scale are negatively correlated alpha might take a negative value, indicating that another reliability model (other than alpha) should be used (Colman 2014a). Most researchers use 0.70 as a lower limit for acceptable alpha values, but Cho & Kim (2014) means that this number stems from a recommendation likely made simply to give some practical aid. Since coefficient alpha is dependent on many attributes of the test or scale, as will be described briefly below, the authors argues that "One size does not fit all." (Cho & Kim 2014, pp. 218).

It is easy to manipulate Cronbach's alpha in order to increase or decrease its values. Since alpha is dependent on the length of the test or scale (Tavakol & Dennick 2011), that is the number of items, alpha should change if the number of items is reduced or increased. Usually, alpha would increase if more items were to be added (Cho & Kim 2014), but alpha could also be increased by deleting items that are not highly correlated to the total test score (Cho & Kim 2014). Yet another strategy to increase alpha is to add items that measure almost the same component of the scale construct (Cho & Kim 2014).

Due to the fact that alpha is dependent on many easy-to-manipulate attributes of the test or scale, a high values of the coefficient does not necessarily mean a high level of internal consistency or reliability (Tavakol & Dennick 2011). Therefore, Cronbach's alpha should not be regarded as a value for the true reliability, but rather as an estimate (Tavakol & Dennick 2011, Cho & Kim 2014).

2.2.5. Multiple linear regression analysis

Regression analysis is about finding an equation that as accurately as possible describes the relationship between a dependent variable and one or more independent variables. As the name implies, in multiple linear regression the equation is linear and there are multiple independent variables (Djurfeldt et al. 2003), as in Equation 2.3. The regression equation is found using the method of least squares, that is minimizing the sum of the difference between the observed values Y and predicted values Y' (Araï 1999).

$$Y' = b_0 + b_1X_1 + b_2X_2 + ... + b_nX_n$$

Equation 2.3 Multiple linear regression equation, where b_i are coefficients, Y' is the predicted values of the dependent variable and X_i are the independent variables (Djurfeldt et al. 2003).

The b-coefficients corresponds to the change in Y' if X changed by one unit (Muijs 2004). It is important to note that since the independent variables are often measured using different scales, large values on b should not be assumed to correspond to a strong influence on Y'. For this, the standardised coefficient β should be used (Muijs 2004).

Multiple linear regression is supposed to be based on interval or ratio data, but in practice many researchers successfully use the method with ordinal variables as well (Muijs 2004). Although, if the analysis is based on ordinal data, it is important to keep in mind that since the data is not equidistant the interpretation of the values of the b-coefficients need to be done very cautiously (Muijs 2004).

The level of measurement is just one of the conditions when using multiple linear regression analysis. Two other conditions are that the relationship between the dependent variable and the independent variables must be linear, and that the correlation between the independent variables shouldn't be too strong (Muijs 2004). The later problem is called multicollinearity.

One way to find out whether the two conditions mentioned above are met is to check the number of outliers and the tolerance of the regression coefficients (Muijs 2004). An outlier is an observation that lies far away from the regression curve, that is the difference between the predicted value and the observed value is substantial. The tolerance is a measure of the correlation between the items in the regression model. If the tolerance is close to zero, there could be a problem with multicollinearity.

To know if the regression equation is a good fit to the observed values, the determination coefficient is used (Araï 1999). If the determination coefficient, also called R-square (Muijs 2004), is 0.76 it means that 76% of the variance of the dependent variable is explained by the regression model (Araï 1999). Some software for statistical calculations provides a measure

called Adjusted R-square. If R-square is interpreted as how well the regression model fits the population, adjusted R-square indicates how well the model fits the sample (Muijs 2004).

2.2.5.1. Regression modelling in SPSS Statistics 22

When doing regression analysis in SPSS there are different options for including or excluding variables in the regression model. In this study the alternative called *Stepwise* will be used. Muijs (2004) explains that the option Stepwise means that only statistically significant variables are included in the regression model. The variable that is the most significant is included first, then the second most significant and so on.

3. CASE STUDY

This study investigates two courses at NCC by conducting a survey research as well as interviews. In this chapter the methods and results of the survey and interviews are presented in that order. But first, there is an introduction to the life cycle of a course at NCC, followed by a brief description of the two investigated courses.

3.1. Introduction to NCC

NCC is one of the three largest construction companies in Sweden (Sveriges Byggindustrier 2014) with approximately 18 thousand employees and sales of 57 billion swedish crowns during 2014 (NCC 2015). In addition to building and constructing for example homes, commercial sites, industries, and roads, NCC also develops the same. Each year NCC arranges 200 thousand hours of training and the demand of courses as well as the need for quick implementation keeps increasing, according to Christian Rosenhamer, manager at Learning & Development, NCC Construction[2].

3.2. Training at NCC

In this section the lifecycle of a course at NCC is described. The information was collected through interviews with the head of the Learning & Development-department in January 2015.

The process of designing and implementing a course at NCC begins with an employee, usually a line manager, a head of department or a member of top management, identifying a need for training. The employee analyzes the training need, puts together the outline of a course to satisfy the need and hands the course proposal to the department Learning & Development (L&D). These steps are illustrated by arrow 1 and 2 in Figure 3.1.

If the course is of strategic interest to the organisation or calls for a big investment, a special board needs to approve the proposed course before the designing and planning can start (illustrated by the dashed line in Figure 3.1). The course is then designed and planned in detail by employees at L&D.

When the course is ready for implementation, that is execution, the targeted employees are notified (arrow 3). Employees are either given the choice to participate or are informed that their participation is compulsory, depending on course. L&D is responsible for the implementation but the actual implementation is usually done by other internal staff members or external educators, in the figure called implementors.

After implementing the course, the next step is evaluation. NCC uses two different kinds of evaluation. The first one is distributed shortly after the end of every course and focuses on the course material and implementation. The second survey aims to investigate the effects the

[2] Christian Rosenhamer (2014) conversation during a supervision meeting the 27th of November 2014.

course had in everyday work, that is to answer the question “What did participants find useful and did the training have the expected effects?”.

The goal is to use the results from the different kinds of evaluation to develop and improve the course (arrow 5). The results are analyzed by L&D and feedback to the internal implementors is provided through their manager.

After redesigning and improving the course, the cycle starts again from arrow 3 in Figure 3.1. The cycle is repeated until the training need is satisfied or the predefined discontinuation criteria are reached.

Due to the increasing demand of new courses and the need for quick implementation of courses, L&D is currently moving from mostly arranging teacherled courses to using other alternatives as well. For example some instructorled courses are now redesigned as e-learning or distance learning. Mentoring is another alternative that will be introduced in the near future.

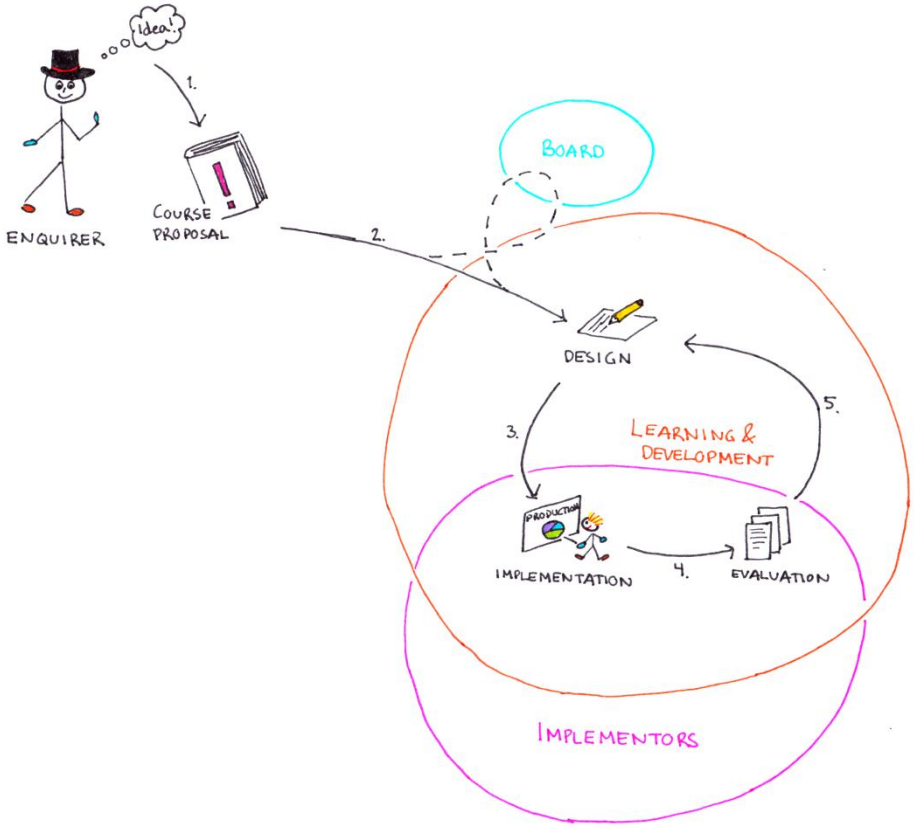


Figure 3.1 An illustration of the life cycle of a course at NCC.

3.3. The two investigated courses

In order to reach a scope suitable for a master thesis, the number of investigated courses was delimited to two. Courses were selected depending on content and extent of strategic interest to NCC. The aim was to choose two courses that are of strategic importance and interest, and whose content differ in kind.

The selection resulted in the two courses; *Cost control* and *Partnering*. *Cost control* is instructive and focuses on what NCC calls hard values, whereas *Partnering* focuses more on soft values and personal development.

The two courses will be described briefly below. The information presented about the courses was gathered from course documents and material about purpose, intended learning outcomes, target group etc.

3.3.1. Cost control

During the course *Cost control* trainees are taught how to use the operational system to control projects financially. Other IT-tools to do checkings and estimates concerning the project's progression are also introduced. The organisational purpose of the training is to improve the accuracy in estimates and to increase the frequency of usage of the IT-tools provided by the organisation.

Other than being able to use the IT-tools in the above mentioned occasions and understand the reasons for doing so, trainees should after completing the course also understand the importance of an accurate project report, understand the meaning of reconcilable production estimate and be able to update a current budget.

When this study was conducted the course was implemented as instructorled classroom training, but NCC is currently redesigning the course to replace the teacherled classroom activities with distance learning.

3.3.2. Partnering

Partnering in the construction industry is a relationship, usually between customers and contractors, based on cooperation, trust and teamwork (Business Dictionary 2015-02-09). The different parties start working together early on in the project with the aim to, in the best possible way, make use of the different competencies in the team.

In the course *Partnering*, which is implemented as instructorled classroom training, trainees are taught about the process of partnering and its definition within NCC. The intended learning outcomes include understanding of what the customer is buying and what NCC is selling in partnering projects, and ability to successfully talk, act and participate in and about partnering projects.

The organisational purpose of the course is to increase the number of employees who understand partnering, to improve long-term sales and bid work, and to clarify the organisation's expectations of employees in partnering projects.

3.4. Survey

The survey research is descriptive and non experimental. The data was collected using a questionnaire that was analysed quantitatively with transfer of training as the dependent variable and the other chosen factors (see section 2.1.4 *Choice of factors to examine*) as independent variables. Below the method and the results of the survey are presented.

3.4.1. Method

After reviewing a lot of research on training in organisations, it seems to me that the use of self-report questionnaires is well established in organisational research and therefore the same method of data collection was used in this study as well. Despite the fact that the accuracy of self-reports is frequently discussed, the answer to the question about whether employees are able to accurately self-report scales such as self-efficacy and training transfer, is yet to be agreed on. However, Facteau et al. (1995) and Chiaburu & Marinova (2005) both claim that there is no research indicating that employees would not be able to accurately self-report for example training transfer.

As mentioned in section 2.2.3 *Spearman Rank-Order Correlation Coefficient*, a cause-and-effect relationship is hard to demonstrate. One of the criteria to be able to confidently say that A causes B, is that there are no other factors influencing the relationship between A and B. In this case, many possible antecedents of training transfer has been excluded from the survey, meaning that there are many not investigated factors that possibly could influence the relationship between one of the independent variables and training transfer. Due to these confounding variables, a cause-and-effect relationship cannot be proved by this survey, but a relationship between the factors and transfer of training can possibly be shown.

The following sections describes in detail the instruments used in the questionnaire, the sample, the procedure by which the survey was conducted and the different steps taken in the analysis of the data.

3.4.1.1. Instruments

To examine the chosen factors, eight scales were used (please refer to section 2.1.4 *Choice of factors to examine* for a detailed description of the process of choosing which factors to include in the study). For the reader who is not yet acquainted with the field, a scale is a set of questions assessing the same construct, such as self-efficacy. Each factor was assessed using one scale, in some cases with several subscales. As can be seen in Table 3.1, most of the scales derive from Axtell et al. (1997). Expected outcome is the only factor measured with a scale derived from another, well-cited group of researchers, namely Maurer et al. (2003). This scale was slightly altered from assessing expected outcomes of training and development activities in general to assessing expected outcome of each of the two specific courses.

Axtell et al. (1997) measured manager support using three different subscales, namely manager facilitation, manager consideration and manager instrumental support. This way of dividing manager support into three different kinds of support will be used in this study as well.

Permissions to use the scales of Axtell et al. (1997) and Maurer et al. (2003) can be found in *Appendix III – Permissions to use the scales*.

FACTOR	SCALE	SUBSCALES	SOURCE	SAMPLE ITEM
SELF-EFFICACY	Self-Efficacy Scale		Axtell et al. (1997)	I thrive in situations where I am constantly challenged.
MANAGEMENT SUPPORT	Line Manager	Facilitation Scale	Axtell et al. (1997)	To what extent does your line manager encourage you to take action without consulting him/her?
		Consideration Scale	Axtell et al. (1997)	To what extent is your line manager friendly and easy to approach?
		Instrumental support Scale	Axtell et al. (1997)	My line manager encourages me to use new skills.
AUTONOMY	Control Scale		Axtell et al. (1997)	To what extent can you vary how you do your work?
EXPECTED OUTCOME	Perceived Benefits of Development Activities	Extrinsic	Maurer et al. (2003)	Better pay or other rewards are likely to result from my participation in the course [course name].
		Intrinsic	Maurer et al. (2003)	My participation in [course name] will not make a difference in how interesting my work is. (Reversed item.)
TIME PRESSURE	Time Pressure Scale		Axtell et al. (1997)	To what extent do you find work piles up faster than you can complete it?
LEARNING	Learning Scale		Designed by author	(Please refer to swedish version in *Appendix I – The survey*)
MOTIVATION	Motivation to Transfer Scale		Axtell et al. (1997)	How committed are you to applying the skills and knowledge from this course to each of the following?
TRANSFER	Transfer Scale		Designed by author	(Please refer to swedish version in *Appendix I – The survey*)

Table 3.1 Investigated factors, the instruments used to measure the factors, subscales when applicable, the origin of the scales and sample items.

As recommended by the manager at Learning & Development at NCC, the items, that is questions, in the scales were translated to Swedish in order to increase the response rate. The translation was validated by letting another student, who is well-versed in English, check the translation and make sure that the swedish translation captured the same content as the original, english wording.

Axtell et al. (1997) measured motivation to transfer by items specific to the content of each course. This study used the same approach for the factors motivation to transfer, learning, and transfer. Course documents provided intended learning outcomes and respondents were asked to rate to what extent they had learnt and used the outcomes. They were also asked to rate how dedicated they were to find ways to apply the learning outcomes. Please refer to *Appendix I – The survey* for the questionnaire in full.

Before distributing the questionnaire to the recipients, it was reviewed by a peer, the manager at Learning & Development and one course participant per course. Their feedback was taken into account and the questionnaire was revised, careful not change the content of each item.

3.4.1.2. Sample

The two surveys were administered to all employees within NCC who had participated in one or both of the courses *Partnering* and *Cost control* during the year 2014. Of the 178 participants in *Partnering*, 69 responded giving a response rate of 39%. Corresponding numbers from *Cost control* are 407 recipients, 182 respondents and a response rate of 45%. Table 3.2 provides some demographical descriptives of the respondents in each course.

		PARTNERING	COST CONTROL
GENDER	Female	14.9	13.7
	Male	83.6	85.7
NUMBER OF YEARS IN CURRENT POSITION	0-1	25.4	21.7
	1.01-2	22.4	7.4
	2.01-3	13.4	16.0
	3.01-5	9.0	18.3
	5-	29.9	36.0
AGE	0-29	6.0	8.0
	30-39	20.9	26.3
	40-49	43.3	30.9
	50-59	23.9	26.9
	60-	6.0	6.9

Table 3.2 Demographics presented as percentage of number of respondents in each course.

3.4.1.3. Procedure

The questionnaire was created and administered using the IT-tool that is custom at NCC. All the recipients got an email explaining the aim of the study and questionnaire, and asking for their participation in the study. The questionnaire, which the recipients were directed to by a link in the email, started with a short introduction that put the study in a wider context by explaining its importance to the process of improving the effect of the courses, and assuring the participants anonymity and confidentiality.

Five days before the closing of the questionnaire, the recipients got a reminder email asking the employees who had not already participated in the survey to kindly take some time to answer the questionnaire.

Please refer to *Appendix I – The survey* for the unabridged email, reminder email and questionnaire introduction (all of them presented in Swedish).

3.4.1.4. Analysis

The data was analysed quantitatively using the software *SPSS Statistics 22*. Below the different steps taken to analyse of the survey results are presented including a short motivation to why the method was chosen. For the theory of each method used, please refer to the section 2.2 *Statistical analysis* in the literature review.

Step 1: Preparation of data

Before conducting the analysis some preparatory work with the data took place. The first step was to check for anomalies in the data and delete the questionnaire responses that contained too many anomalies. The following criteria were used for the deletion of questionnaire responses:

- None of the Transfer Scale items were answered.
- The respondent provided the same answer to every single question (except the demographic questions in some cases).

In order for the survey to answer my research question, it is important for the data to include information on my dependent variable, training transfer. Therefore, the first criterion was set. The second criterion was included to minimize the risk that the answers from respondents who did not truly read and reflect on the questions, but simply checked the same box for each item, would distort the survey results. In *Partnering* two response sheets were deleted and the corresponding number in *Cost control* was seven.

The preparation of the data also included recoding the scoring of reversed items and checking the descriptives to make sure that they were plausible.

Step 2: Cronbach's alpha

Cronbach's alpha was used as an estimate of the internal consistency or test reliability of each scale and subscale. As mentioned in the literature review (section 2.2.4 *Cronbach's alpha*), the use of Cronbach's alpha has been questioned in recent years, but since alpha is still custom in the field to use as an estimate of reliability it will be used in this study as well. Please note that the coefficient should be interpreted with caution and that one should not attribute too much importance to the size of alpha.

Step 3: Correlation analysis

After checking the reliability, indexes for the scales and subscales were created. To choose the appropriate correlation coefficient for the correlation between the indexes, it is important to regard the level of measurement. There are three frequently used correlation coefficients, namely Pearson, Spearman and Kendall. Pearson can only be used with interval or ratio

variables (Araï 1999), whereas the data used in Spearman and Kendall need to be at least ordinal (Morgan et al. 2004). Although some authors claim that the level of measurement of indexes can be regarded as at least interval, even if they were built on ordinal variables (e.g. Djurfeldt et al. 2003), it would not be mathematically correct to use Pearson's correlation coefficient according to Tykesson[3]. In this study, that leaves us with Spearman rank correlation coefficient and Kendall's Tau. Of these two, Spearman rank correlation coefficient is the most frequently used (Araï 1999) and will therefore be used in this study as well.

Step 4: Regression analysis

As a last step in the analysis of the survey results, a multiple linear regression model was created and the conditions of regression analysis were checked. As noted in the literature review (section 2.2.5 *Multiple linear regression analysis*) regression analysis is supposed to use interval or ratio data, but it has been used successfully with ordinal data as well. With this in mind, and the fact that some authors argue that indexes of ordinal variables can be regarded as at least interval (Djurfeldt et al. 2003), the decision of using regression analysis as a final step in the analysis of the questionnaire data was made.

3.4.2. Results

In this section the results of the statistical analysis of questionnaire data are presented. The tests performed are Cronbach's alpha, frequencies, Spearman correlation and multiple linear regression analysis. The reader who does not have a basic understanding of the theory behind these tests, is advised to first read section 2.2 *Statistical analysis* in the literature review.

When the size of coefficients are presented in the text below, the value from the course *Partnering* is presented first followed by the value from the course *Cost control*, as in the following example:

> *The analysis demonstrated a weak positive relationship between transfer and motivation to transfer (P: r_s=0.311, p=0.026; C: r_s=0.255, p=0.003).*

3.4.2.1. Cronbach's alpha

To get an indication on whether the items in the scales measure the same construct, Cronbach's alpha was calculated for each scale and subscale. As can be seen in Table 3.3, the values on Cronbach's alpha are all higher than 0.7, which indicates a satisfactory level of internal consistency. The highest value on alpha, namely 0.94 for transfer in *Partnering*, could be troublesome, as it implies that the items in the scale measure the exact same aspect of the scale construct. But since we know that the items within the scale measure different learning outcomes, that is different aspects of the construct transfer, this should not give reason for concern.

[3] Johan Tykesson (Assistant profressor, Division of Mathematical Statistics, Department of Mathematical Science, Gothenburg University) in a supervisor meeting with the author, the 2nd of March 2015.

SCALE	PARTNERING	COST CONTROL
Self-efficacy	0.851	0.748
Manager Facilitation	0.805	0.837
Manager Consideration	0.885	0.922
Manager Instrumental Support	0.878	0.835
Autonomy	0.851	0.852
Expected outcome, extrinsic	0.880	0.769
Expected outcome, intrinsic	0.812	0.804
Time Pressure	0.915	0.897
Learning	0.827	0.874
Motivation to transfer	0.921	0.897
Transfer	0.942	0.888

Table 3.3 Cronbach's alpha for each scale in the two questionnaires.

3.4.2.2. Frequencies

In order to get a picture of the result, the means of each index is presented below, in Table 3.4. It is easily noted that the means of the indexes in the two courses correspond well with each other. The biggest difference between the courses can be seen in the index learning.

Another thing worth pointing out is that the mean of expected intrinsic outcome is higher than the one for expected extrinsic outcome. When looking at the frequencies for each item within these two scales, it is clear that most of the trainees in both of the courses thought the course was rewarding (P: 79.1%; C: 54.8%), but very few thought the course was likely to result in a promotion or rise in salary (P: 4.5% and 3% respectively; C: 10.3% and 2.3% respectively). In *Partnering* more respondents expected personal development as an outcome of the course than in *Cost control* (P: 52.3%; C: 30.3%).

The items of the scales Learning and Transfer all had the mode 4, on a scale ranging from 1-5 where a higher number corresponds to a higher perceived level of learning or transfer.

INDEX	PARTNERING	COST CONTROL
Self-efficacy	3.94 (0.56)	3.90 (0.56)
Manager Facilitation	3.17 (0.80)	3.21 (0.87)
Manager Consideration	4.13 (0.75)	4.09 (0.89)
Manager Instrumental Support	3.75 (0.69)	3.80 (0.68)
Autonomy	4.39 (0.58)	4.33 (0.63)
Expected outcome, extrinsic	1.88 (0.90)	1.92 (0.95)
Expected outcome, intrinsic	3.11 (0.76)	2.73 (0.79)
Time Pressure	3.27 (0.98)	3.32 (0.99)
Learning	4.27 (0.65)	3.73 (0.86)
Motivation to transfer	4.11 (0.69)	3.86 (0.76)
Transfer	3.99 (0.77)	3.93 (0.80)

Table 3.4 Means (standard deviation) of the indexes per course. Scores range from 1 to 5.

3.4.2.3. Correlation analysis

To check the condition that the values of the variables are monotonically related (see section 2.2.3 *Spearman Rank-order Correlation Coefficient*), a scatter plot matrix was used. The scatter plots gave no sign that the values wouldn't be monotonically related, meaning that the conditions for using Spearman correlation coefficients were met.

The correlation analysis of both courses demonstrated that transfer of training had a positive, significant relationship to self-efficacy, manager instrumental support, learning and motivation to transfer, see Table 3.5 and Table 3.6. In addition, the data from *Cost control* also demonstrated that manager facilitation had a positive relationship to transfer and that manager consideration did not influence transfer. No factors had a significant negative relationship with training transfer.

The fact that learning had a positive relationship to transfer (P: r_s=0.463, p=0.001; C: r_s=0.629, p=0.000) is hardly surprising, since it seems reasonable that more learning, likely leads to more transfer. Neither is the positive relationship between motivation to transfer and transfer unexpected, as it is in line with previous research results (e.g. Franke & Felfe 2012; Gegenfurtner et al. 2009). In the current study motivation to transfer had the strongest relationship with transfer in both courses (P: r_s=0.527, p=0.000; C: r_s=0.757, p=0.000).

The relationship between transfer and manager support differed with course and kind of support. The only kind of support with a significant relationship to transfer in *Partnering* was instrumental support with a moderate (Muijs 2004) positive relationship (P: r_s=0.428, p=0.002). The same relationship in *Cost control* was modest (Muijs 2004), but still positive (C: r_s=0.213, p=0.014). Manager consideration had no influence on transfer in *Cost control* (C: r_s=0.197, p=0.023) and manager facilitation was modestly related to transfer (C: r_s=0.315, p=0.000).

Self-efficacy had only a modest positive relationship to transfer in both courses (P: r_s=0.311, p=0.026; C: r_s=0.255, p=0.003).

Spearman correlation for *Partnering*

	1	2	3	4	5	6	7	8	9	10	11
1 SELF-EFFICACY	1.000										
2 MANAGER FACILITATION	-.003	1.000									
3 MANAGER CONSIDERATION	-.065	.581**	1.000								
4 MANAGER INSTRUMENTAL SUPPORT	.080	.647**	.620**	1.000							
5 AUTONOMY	.245	.261	.444**	.373**	1.000						
6 EXPECTED OUTCOME EXTRINSIC	-.297*	.360**	.062	.207	-.099	1.000					
7 EXPECTED OUTCOME INTRINSIC	.090	.140	-.076	.104	-.165	.372**	1.000				
8 TIME PRESSURE	-.085	.068	.081	-.020	-.210	-.139	-.067	1.000			
9 LEARNING	.316*	-.044	-.015	.152	.097	-.183	.220	-.097	1.000		
10 MOTIVATION TO TRANSFER	.242	.075	-.022	.299*	.041	-.052	.289*	-.106	.656**	1.000	
11 TRANSFER	.311*	.147	.213	.428**	.257	-.135	.161	.099	.463**	.527**	1.000

Table 3.5 Spearman rank-order correlation coefficients for investigated factors in Partnering.
** $p < 0.05$, ** $p < 0.01$*

Spearman correlation for *Cost control*

	1	2	3	4	5	6	7	8	9	10	11
1 SELF-EFFICACY	1.000										
2 MANAGER FACILITATION	.166	1.000									
3 MANAGER CONSIDERATION	.284**	.596**	1.000								
4 MANAGER INSTRUMENTAL SUPPORT	.176*	.629**	.695**	1.000							
5 AUTONOMY	.215*	.000	.217*	.299**	1.000						
6 EXPECTED OUTCOME EXTRINSIC	.077	.313**	.159	.121	-.084	1.000					
7 EXPECTED OUTCOME INTRINSIC	.047	.178*	.036	.017	-.114	.589**	1.000				
8 TIME PRESSURE	-.073	-.112	-.234**	-.148	.092	-.033	-.025	1.000			
9 LEARNING	.120	.255**	.117	.156	.144	.223*	.252**	.086	1.000		
10 MOTIVATION TO TRANSFER	.351**	.255**	.155	.203*	.200*	.166	.154	.127	.698**	1.000	
11 TRANSFER	.255**	.315**	.197*	.213*	.161	.087	.158	.136	.629**	.757**	1.000

Table 3.6 Spearman rank-order correlation coefficients for investigated factors in Cost control.
** $p < 0.05$, ** $p < 0.01$*

Regression model for *Partnering*

INDEPENDENT VARIABLE	BETA	TOLERANCE	ADJUSTED R-SQUARE	NUMBER OF OUTLIERS*
STEP 1				
Learning	.516	1.000	.251	0
STEP 2				
Learning	.522	1.000	.367	0
Manager Consideration	.354	1.000		
STEP 3				
Learning	.309	.600		
Manager Consideration	.378	.992	.426	0
Motivation to transfer	.339	.597		

Table 3.7 Multiple linear regression model in Partnering.
** More than three standard deviations from curve of regression.*

Regression model for *Cost control*

INDEPENDENT VARIABLE	BETA	TOLERANCE	ADJUSTED R-SQUARE	NUMBER OF OUTLIERS*
STEP 1				
Motivation to transfer	.733	1.000	.533	2
STEP 2				
Motivation to transfer	.695	0.910	.544	2
Manager Facilitation	.125	0.910		

Table 3.8 Multiple linear regression model in Cost control.
** More than three standard deviations from curve of regression*

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3.4.2.4. Multiple linear regression analysis

In the regression analysis all indexes were included and the option Stepwise was used for including variables in the regression model. The conditions for linear relationships between the dependent variable and the independent variables, and multicollinearity, were checked using outliers and tolerance, as recommended by Muijs (2004).

Both conditions were met for both courses. The values of the tolerance in all models gave no reason for concern, see Table 3.7 and Table 3.8. In *Partnering* there were no outliers at all. The two outliers in *Cost control* are too few in comparison with the sample size to indicate a problem of multicollinearity.

The regression model for *Partnering* includes three independent variables – learning, manager consideration and motivation to transfer – which all influence training transfer to the same extent, see Table 3.7. In *Cost control*, the model includes motivation to transfer and manager facilitation. Motivation to transfer (β=0.695) had a much bigger influence on training transfer than manager facilitation (β=0.125) as can be seen in Table 3.8.

Both models predict transfer significantly well with p-values below 0.001 and the model fit the data moderately to very well (Muijs 2004). The determination coefficient, that is the adjusted R-square, tells us that 43% of the variance in training transfer in *Partnering* can be explained by the model. The same number for *Cost control* is 54%.

3.5. Interviews with enquirers

Two interviews were conducted with one enquirer of each course. In this section the method and result of the interviews are presented.

3.5.1. Method

The two interviews were conducted in order to capture the enquirers' thoughts about and expectations of the courses. The aim was to learn more about expected learning outcomes, organisational outcomes and other aspirations of the courses.

3.5.1.1. Interviewees

The interviewees were one of the enquirers of each of the two courses. Jennie, manager at the division Market Development in segment House, has been responsible for the design and implementation of the course *Partnering* since the beginning of the course. The same goes for Ola, manager and specialist in cost control, who has been responsible for the design and implementation of the course *Cost control* since its beginning.

3.5.1.2. Procedure and analysis

The interviews were qualitative and structured. They were conducted in a secluded room with glass walls toward the corridor and documented using a Dictaphone. The interviewees were asked to set aside an hour for the interview, a time span that was sufficient as the interviews took about 45 minutes.

In the beginning of each interview the interviewees were informed about the purpose of the interview and how their answers will be used. The interviewees were also told that anonymity could not be guaranteed, but that they after the interview would be able to choose whether I were to use their name in the report or not. Please refer to *Appendix II – The manuscript to interviews* for the whole set of questions asked in the interviews.

The recordings of the interviews were transcribed and compiled into an interview story, of which a summary will be presented below.

3.5.2. Results

Below a summary of the results from the interviews are presented. In the discussion these results will be related to the results from the survey.

3.5.2.1. Jennie – Partnering

Jennie is one of the creators of the course *Partnering* and has worked with the course since its start. She is employed as the manager of market development in segment House. The following information about the course was gathered during the interview with Jennie.

At the end of 2013, NCC identified two problems with partnering projects. Firstly, the ongoing partnering projects were not pure enough to give the entrepreneur the opportunity to work according to pure partnering. The different kind of incentives added in the contracts hindered NCC from acting with solely the project's best in focus. Secondly, since NCC had not fully implemented the term partnering and informed the employees about partnering, the employees did not know what it meant to act according to partnering. As one step in addressing these problems NCC started a course in partnering. In the beginning the course only existed in the west of Sweden, but was later implemented countrywide.

The course *Partnering* has several aims relating to the employee. One of them is that the employees, after participating in the course, will understand what it means to work in partnering projects, with the project's best in focus, and why is it important to be open and honest. A second goal is that the employees in partnering projects should work together with the customer and the other stakeholders. NCC also wants the employees to understand why NCC strives for a move towards pure partnering projects with no incentives.

Other effects that NCC wants the course to have, are a more stable profitability and an increased number of bids that ask for pure partnering.

But what about the employee? What does the employee get from participating in the course? NCC thinks that employees, after participation, feel more secure in their acting in partnering projects and feel a stronger desire to work in partnering projects.

3.5.2.2. Ola – Cost control

Ola has been part in developing the course *Cost control* since its start. He is employed as a manager and specialist in cost control. The interview with Ola resulted in the following information about the course and its aims.

A couple of years ago NCC noticed a problem with the economy in projects. The estimates were often inaccurate, and when projects were not going according to plan it was usually realised too late. Two causes for these problems were identified; 1) the employees lacked competence in cost control, and 2) NCC did not have any documentation describing how to work with cost control in the organisation. To solve this, a course in cost control was designed and instructions for how to work with cost control were written.

One of the aims with the course *Cost control* is that employees should not only start working according to NCC's instructions, but also should they understand the theory behind the methods. If this is achieved it will hopefully and probably lead to a higher and more stable profitability for NCC.

After participating in the course, NCC hope for the employees to have learnt more about cost control, to feel that they can do a better job, to feel a greater satisfaction in their job and to feel calmer since their control of the projects' economy has improved. Ola also brings up the possibility that employees expect to learn how to use the IT-tools in cost control, which is not handled to any extent in the course.

4. DISCUSSION

In this section the results of the study will be discussed in relation to research questions (see section 1.1 *Aim of current study*), previous research, future research and implications for training at NCC. Some limitations of the study will also be brought to light and possible ways of improving the methodology of the study is discussed.

4.1. Research and discussion questions

The results of this study suggest that training transfer is positively influenced by different kinds of manager support, self-efficacy, learning and motivation to transfer. No results indicated that any of the included factors had a negative influence on training transfer. This section will comment on the study results and also answer the research and discussion questions presented in the introduction, see section 1.1 *Aim of current study*.

RQ 1: When trainees return to work from training, which are the antecedents of training transfer, other than course characteristics?

A correlation analysis investigates whether two variables correlate, that is if the variance of one of them corresponds to the variance of the other. This means that in order to get significant values on the correlation coefficients the values of the variables need to vary. In this study many of the correlations were not significant and one of the reasons might be too small variances. After adjusting the indexes to the measurement scale 1 to 5, the standard deviation of the indexes ranged from 0.5 to 1.0 in both courses, which is a fairly short range.

The factors that had a significant correlation to training transfer were self-efficacy, different kind of manager support, learning, and motivation to transfer, which is coherent with previous research, see next section 4.2 *Previous research*. It is of course natural that learning influences transfer, since it is hard to use knowledge and skills if you haven't learnt them first. Following this argument, one might wonder why the correlation between learning and transfer was not even stronger (P: r_s=0.463, p=0.001; C: r_s=0.629, p=0.000). There are several possible explanations to this. Firstly, there is always the possibility that employees have misunderstood the wording of the questions or valued the rating scale of learning and transfer differently. Secondly, the questions about learning captured learning from the course. Some employees might have learnt the knowledge elsewhere but still use the knowledge and therefore rated learning low and transfer high. Thirdly, learning does not necessarily mean transfer. It is possible that some trainees learnt the content of the course, but did not apply the knowledge in their everyday work.

Readers might be wondering why so few factors were included in the regression models. This is because when using the regression method *Stepwise* independent variables are included one at a time starting with the variable that has the highest significance. When there are no more variables that meet the inclusion criterion, that is no more variables that would be significant enough in the model, the model is complete. In this study there were many variables that would not have been significant enough in the model and they were therefore excluded from the regression models.

Altogether, motivation and different kinds of manager support seem to be important to training transfer in both the correlation analysis and the regression modelling. As noted above, it is natural that learning correlates with transfer. In theory, learning should even set the boundaries for possible transfer. It could therefore be surprising to some readers that learning is not included in the regression model of *Cost control*. This serves as an example that statistics and calculations do not always or necessarily match the reality. It is therefore important to reflect on the results in relation to theory and reality.

In the preparatory interviews employees identified time pressure as a factor hindering training transfer. They meant that insufficient time and too much stress hindered them from using new skills and knowledge, since it is time consuming to try new approaches and methods. Unfortunately this study was unable to confirm or contradict such a relationship between time pressure and transfer.

Of course there are many more antecedents than investigated in this study.

RQ 2: What outcome do trainees expect from participation in a course and how does that affect their perceived training transfer?

The means of the factors *Expected outcome, extrinsic* and *Expected outcome, intrinsic* indicates that the employees within NCC expected intrinsic outcomes of a course rather than extrinsic outcomes. The majority of the respondents think that work tasks will become more interesting and that personal development is likely as a result of the course, whereas very few think that the course is likely to results in a promotion or raise in salary.

The correlation analysis failed to give any significant results regarding the relationship between expected outcomes and training transfer. Therefore this part of the research question remains unanswered. It would be interesting for future research to continue to investigate if there exists a relationship.

RQ 3: Is the learning and transfer of a course the one that the enquirer expected?

The questionnaire captured four of the learning goals of the two courses and the results show that most of the respondents learned and transferred all of them to some extent. In *Partnering* the respondents perceived that they learnt all of the four goals about the same, whereas in *Cost control* there was a slight difference between the different learning goals. Almost all of the respondents in *Cost control* (81.1%) reported that they understand the importance of an accurate project report, but just over half of the respondents reported that they know how to use the IT-tools for cost control, update a budget or make an estimate.

Altogether, the survey result indicates that most of the participants in the courses learn and transfer what the enquirer expects. The fact that the respondents in *Partnering* thought that the course helped their personal development is in line with Jennie's explanation that the course's main focus is about changing people's attitudes. Also, Ola's idea that the course might help employees to feel more in control and more secure when it comes to managing the economy of their projects, is at least not undermined by the fact that 67.9% of the respondents in *Cost control* stated that the influence of the course on their self-esteem was non-existing or positive.

RQ4: How do the trainees' expectations of the outcome of a course relate to the enquirers'? Do they reinforce or counteract each other?

The enquirers' expectations are very much related to the learning goals of the courses. They expect the participants to increase their learning, understanding and skills in the field relevant for the course. In section 3.3 *The two investigated courses* the learning goals of each course is described. As noted above, the enquirers' expectations when it comes to learning and transfer are generally met in the two courses.

The interviewed enquirers, Jennie and Ola, brought up some other expectations, or rather aspirations, that were not part of the learning goals. Jennie described that the course *Partnering* is very much about a change in the employees' attitudes when taking part in partnering projects. Ola hoped that the course *Cost control* could help the participants to feel more in control and more secure in managing the economy of their projects.

Both of these expectations, or aspirations, could be seen as intrinsic outcomes for the employees. As mentioned above, this is in line with the participants' responses regarding *Expected outcome, intrinsic*.

To sum up, when looking at the results of this study it seems like the enquirers' and course participants' expectations are in line with and do not contradict each other.

4.2. Previous research

In the literature review some previous research on each of the included factors were presented, see section 2.1.4 *Choice of factors to examine*. All factors but time pressure have been demonstrated to positively influence training outcomes such as learning and transfer. Time pressure as a separate factor has, to my awareness, not been investigated.

The result of this study does not contradict any of the previous research results. This also means that none of the results in this study is surprising.

Below the study results will be compared to other research that used the same scales, that is Axtell et al. (1997) and Maurer et al. (2003). Means of the indexes that are measured with the same scale will be compared to see to if results seem to be generalisable to other cultures. Since most of the scales derive from Axtell et al. (1997) and the dependent variable, transfer, was measured with similar instruments, the correlation coefficients between these indexes can also be compared.

When it comes to comparing means, the values are similar for all factors but not too consistent. The factor with most consistency between this study and the original study is self-efficacy. Axtell et al. (1997) reported a mean of 3.6 on a 5-point likert scale, which corresponds well with this study's 3.9 for both courses. Motivation to transfer and autonomy differed a bit more between the studies, where Axtell et al. (1997) measured means of 3.7 and 3.4 respectively, and this study reported 4.4/4.3 (*Partnering / Cost control)* and 4.1/3.9. The two factors with the biggest difference between means are expected, extrinsic outcome and transfer, where the means differ more than one unit.

It is easily noticed that the difference in means between this study and the original study is bigger than the difference in means between the two investigated courses for all factors. There are of course many possible reasons for this. It could be a coincidence. It could also be due to either cultural differences between NCC and the organisations were Axtell et al. (1997) and Maurer et al. (2003) conducted their studies, or cultural differences between the different countries, Sweden and Great Britain, were the studies were conducted.

Many of the investigated factors and scales in this study are common with the factors and scales used in Axtell et al. (1997); autonomy, manager support, motivation to transfer and self-efficacy. This means that it makes sense to compare the correlation coefficients for the correlation between transfer and these factors. Unfortunately there were no significant correlation between transfer and autonomy in this study and the study of Axtell et al. (1997) did not result in any significant relationship between transfer and self-efficacy. Left to compare are manager support and motivation to transfer.

The correlation between transfer and manager support in Axtell et al. (1997) was reported to 0.31. The significant correlation coefficients for different kinds of manager support in this study ranged from 0.2-0.4. All the said numbers are generally considered as a weak positive relationship.

When it comes to motivation to transfer the results in *Partnering* and Axtell et al (1997) are very consistent, with a correlation coefficient of 0.5. In *Cost control* the corresponding coefficient was 0.8. The difference is slightly bigger than manager support, but still indicates a moderate to strong positive relationship.

The regression analysis of this study cannot be compared to the regression model of the study done by Axtell et al. (1997). This is because their regression model includes the factor relevance, which was not part of the scope of this study, since it is a course characteristic.

To sum up, there are differences between the means and the correlation coefficients in this study, Axtell et al. (1997) and Maurer et al. (2003). But the results still point in the same direction, indicating that the results of this study seem to be valid in other western countries as well.

4.3. Limitations

In this section some of the limitations of this study will be discussed. The focus will be criticizing the research methodology and reflecting upon its effect on the results.

In addition to self-reporting (see section 3.4.1), another possible problem with the data collection is that the data was collected from only self-reporting. This entails that there is a risk that the observed results are a consequence of some aspect of the data collection method, instead of reflecting the actual situation (Facteau et al. 1995). Axtell et al. (1997) overcame this problem, as well as problems with self-reports, by adding another data collection method, namely letting the managers of the employees rate the employees' training transfer. Due to time limits, this was not possible in this study.

The low number of respondents is the current study could be one of the reasons why the significant results were so few. It is plausible that using telephone calls rather than email to remind employees to participate in the survey, would have increased the response rate. Unfortunately, since the choice of hiding the participants' identity was made, there was no information on which employees had responded or not responded. Therefore reminders by telephone calls were not viable.

I would also like to comment on the fact that one of the scales, *Expected outcome, extrinsic*, only has two items. To my awareness it is not common with scales as short as that, but recent research has shown that shorter scales can be as effective as longer scales, even scales using only one item (Sahinidis & Bouris 2008).

As noted in section 3.4.1.2 *Sample*, the response rate was 39% and 45% in *Partnering* and *Cost control* respectively, indicating that there was a problem with non-response. It is possible that the response rate would have been greater if the introduction email was clearer on the fact that this is not a regular evaluation of a course or its effects, since several employees asked questions regarding the confusion they felt with the questionnaire items.

When looking through the responses to the questionnaires, a few of the response sheets stood out. The answer to the items in the beginning of the questionnaire varied, but then after a couple of scales the respondent started giving the same answer to each item. Since some items are reversed, it is not likely that such an answer is thoroughly considered. Instead that pattern of responses indicates that there was some response fatigue. The number of answers with this pattern are not big enough to be concerning, but number of cases of response fatigue might be higher that the number of this kind of patterns since response rate might show in other ways as well. For example, response fatigue could be a reason for respondents to cancel the questionnaire before completion, or give random answers in a pattern that cannot be identified as a consequence of response fatigue. Unfortunately, it was not possible to get the number of cancellations from the IT-tools used for administrating the questionnaire.

As mentioned before there are many confounding variables in a study like this, see section 3.4.1 *Method*. This means that a cause-and-effect relationship cannot be proved. It is important that the reader understand that none of the investigated factors can be identified as the cause of training transfer. The study can only show that there exists a relationship between some factors and transfer.

Lastly, I would like to comment on the statistical analysis of the questionnaire results. For example it is possible that there are better, and more appropriate, statistical tests to do the analysis or follow-up tests to further analyse the data for better understanding. There are also some conditions in multiple regression analysis that were not checked, because the tests require more complicated statistics than I am able to understand at the moment.

4.4. Future research

As Kyndt & Baert (2013) states, antecedents of work-related learning is a relatively new field of research. This means that the research is still fairly incoherent and there is, to my awareness, no common and established theory or model. Instead, many researchers use different research models and different approaches. For example, there is no consensus on whether informal and formal learning should be researched separately or not. Kyndt & Baert (2013) argues that research on whether formal and informal learning have the same antecedents or not is both interesting and needed.

Another example is the question about the role of motivation. Is motivation an antecedent to transfer just like the others, or is it mediating the effect of the other antecedents on training transfer? Or maybe it partially mediates the effect of the other antecedents? Some researchers have investigated this (e.g. Colquitt et al. 2000), but the question needs further research.

As noted before, the preparatory interviews with employees at NCC, resulted in the understanding that time pressure could be an important antecedent of training transfer, with a negative relationship. Unfortunately this study failed to prove or disprove this due to insignificant results regarding the relationship between training transfer and time pressure. Since I have failed to find any research on time pressure as an antecedent of training transfer, and since the employees at NCC claims that time pressure has a lot of influence on whether new skills are used or not, it would be interesting if future research investigated this.

In the previous section, section 4.3 *Limitations*, the ongoing discussion on the accuracy of self-reports was brought up. In the researched field of training transfer, antecedents are usually measured using self-reporting questionnaire, as in this study. Since self-reports as a data collection method has been questioned, future research might benefit from using triangulation, that is combining different data collection methods. For example, self-reporting questionnaires could be combined with knowledge tests or ratings from colleagues or manager.

Lastly, the size of the correlation coefficients between some of the scales, for examples the different kinds of manager support, indicates that they might measure the same thing and that the questionnaire likely could be shortened. To answer this question other statistical analysis are required, which I do not have any knowledge in. Future studies might benefit from conducting those tests in order to shorten the number of items and/or scales.

4.5. Recommended actions to NCC

Even though this study did not provide as much significant results as hoped for, some suggestions of actions to improve the transfer at NCC could still be made. It is important to note that of all significant results none showed a negative relationship to training transfer. This means that this study cannot conclude that there is anything hindering transfer of knowledge from any of the two courses. In other words, this study can only suggest actions to boost already existing positive relationships, and not suggest actions that would eliminate factors with negative relationships to transfer.

Firstly, the correlation analysis and the regression models of both courses all demonstrated that motivation to transfer has a positive influence on training transfer. It is therefore important to make sure that employees are motivated to transfer newly acquired skills. To do this, Axtell et al. (1997) recommends managers to actively work with creating and preserving positive attitudes towards work-related training and learning among employees.

Secondly, the importance of manager support differed between the two courses. In *Partnering* manager instrumental support was more important than in *Cost control*, whereas in *Cost control* manager facilitation was most important. This might be because the goal in *Partnering* is, as Jennie mentioned in the interview, for the employees to change their attitude and way of acting, whereas in *Cost control* the goal is to use the methods taught in the course. One way to understand it is that if the transfer requires a personal change, or a change of character, it is important for the manager to encourage new ideas and actions as well as tolerating mistakes. If the transfer is more about changing the way of doing something, the manager should focus on making the transfer possible by offering help with planning and ideas on how the employee could improve his or her performance.

Even if the relationship was weaker than other research has shown, the survey results of both courses demonstrated a positive relationship between self-efficacy and training transfer. Colquitt et al. (2000) suggests that in order to increase self-efficacy among the trainees, the organisation should make the target of the training clear and help the trainees understand that they are capable of succeeding in the training.

5. CONCLUSIONS

This study tried to identify some antecedents of training transfer in two courses at NCC, a Swedish construction and property development company. The literature review resulted in factors, or possible antecedents, to investigate and a survey research captured the employees' perceptions of the chosen factors. The quantitative analysis of questionnaire demonstrated that self-efficacy, different kinds of manager support, motivation to transfer and learning correlated positively with training transfer. None of the investigated factors had a negative relationship to training transfer.

To understand the enquirers' aim and expectations of the investigated courses, course documentation was reviewed and interviews with one enquirer of each course were held. When comparing the results from the interviews with the results from the survey, the enquirers' and employees' expectations of the course and its outcomes do not seem to contradict each other. Rather, it seems like the enquirer expectations on outcomes are met, both when it comes to learning goals and softer aspirations, such as personal development.

The result of this study confirms the findings of previous research and again demonstrates that it is important to remember that trainee characteristics, such as motivation and self-efficacy, and work environment factors such as manager support, influence the transfer of the trainee.

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APPENDIX I – THE SURVEY

This appendix includes the questionnaire items as well as the introduction and reminder email, and the introduction in the questionnaire. It is written in Swedish in order to minimise the risk of employees not responding due to language barriers.

Introduction text in the questionnaire

> NCC satsar mycket på utbildningar och kurser och det är då viktigt att utbildningarna får effekt i organisationen. Den här studien undersöker faktorer som påverkar överföringen av kunskap från utbildning till det dagliga arbetet. Enkätstudien görs i två av NCC:s kurser och kommer att kompletteras med intervjuer.
>
> Du har fått denna enkät för att du under 2014 har deltagit i utbildningen Ekonomistyrning och för att dina tankar är viktiga för utvecklingsarbetet av kursen. Enkäten går ut till 407 medarbetare.
>
> Undersökningen görs i samband med mitt examensarbete och information som du lämnar kommer att hanteras enligt Chalmers tekniska högskolas etiska regler. Det innebär att informationen är anonym och hanteras konfidentiellt. Ditt deltagande i studien är frivilligt, men jag vore tacksam om du ville bidra med dina svar. Vid frågor kring studien, vänligen kontakta mig, Annie Gjers, på annie.gjers@ncc.se.

Items in the questionnaire

Below the items of the questionnaire are listed in the order of the questionnaire and grouped as the scale. Each scale had its own page in the online questionnaire.

Demographic questions

Explanation of following list: Variable (*level of measurement*).

1. Age (*interval*)
2. Gender (*nominal*)
3. Position in organisation (*nominal/ordinal*)
4. Time in current position (*interval*)

Self-efficacy

The scale derives from Axtell et al. (1997).

1. Jag tror att jag kan övervinna de flesta oväntade hinder som kan uppkomma.
2. Jag saknar färdighet och erfarenheter för att kunna hantera svåra situationer.
3. Jag trivs i situationer där jag får ständig utmaning.
4. Jag brukar undvika situationer som ligger på gränsen till vad jag klarar av.
5. Jag tror sällan på min förmåga att prestera i nya situationer.
6. Jag känner mig ofta obekväm i nya, annorlunda situationer.

7. Mina tidigare erfarenheter och bedrifter har visat mig att jag kan hantera nästan allt som händer i livet.
8. Jag är en sådan person som tycker att det är svårt att klara av riskfyllda och osäkra situationer.
9. Jag är van vid att sikta högt och få som jag vill.
10. Jag ser mig själv som en effektiv person i många olika situationer.

Manager support

This scale consists of three subscales and derive from Axtell et al. (1997).

A. Facilitation
    1. Min chef uppmuntrar mig att ta egna initiativ utan att fråga först.
    2. Min chef visar mig hur jag kan prestera bättre på jobbet.
    3. Min chef ger mig den hjälp jag behöver för att kunna planera.
    4. Min chef kommer med nya idéer för att lösa jobbrelaterade problem.
    5. Min chef berättar för mig hur bra jag presterar.
B. Consideration
    1. Min chef är vänlig och lätt att ta kontakt med.
    2. Min chef är uppmärksam på vad jag säger.
    3. Min chef är villig att lyssna på mina problem.
C. Instrumental support
    1. Min chef är inte öppen för förändringar.
    2. Min chef uppmuntrar mig att använda nya färdigheter.
    3. Min chef försöker se det jag gör bra, snarare än bara det jag gör fel.
    4. Min chef uppmuntrar mig att komma på nya sätt att göra saker på.
    5. Min chef ger mig inte utmanande arbetsuppgifter.
    6. Min chef stöttar mig när jag testar nya färdigheter.
    7. Min chef uppskattar inte nya idéer.
    8. Min chef tolererar misstag när jag testar något nytt.
    9. Min chef erkänner mig inte när jag kommer på bra idéer.
    10. Min chef försäkrar sig om att jag har den utbildning jag behöver för att kunna göra ett bra jobb.

Autonomy

This scale derives from Axtell et al. (1997).

1. Jag har möjlighet att variera mitt arbetssätt.
2. Jag planerar mitt egna arbete.
3. Jag har möjlighet att själv bestämma hur jag vill genomföra mina arbetsuppgifter.
4. Jag har möjlighet att själv välja vilken metod jag vill använda för att genomföra mina arbetsuppgifter.
5. Jag ansvarar för mitt egna arbete.

Time pressure

This scale derives from Axtell et al. (1997).

1. Jag är under ständig stress på jobbet.
2. Jag upplever att arbetsuppgifter kommer in fortare än jag hinner avsluta dem.
3. Jag upplever att jag måste arbeta snabbare än jag önskar att jag behövde.
4. Jag har för mycket att göra för att testa nya tillvägagångssätt på jobbet.

Expected outcome

This scale consists of two subscales and derive from Maurer et al. (2003). The page with these item started with the following instruction:

> *På följande frågor ska du svara som du tänkte, eller tror att du tänkte, när kursen precis var avslutad. Om du inte minns hur du tänkte då, svara så som du tänker nu.*

A. Expected extrinsic outcome
    1. Det är större chans att jag blir befordrad efter att ha deltagit i [utbildningen].
    2. Det är troligt att jag får löneförhöjning eller annan belöning för att ha deltagit i [utbildningen].
B. Expected intrinsic outcome
    1. Mitt arbete kommer troligtvis bli mer intressant för att jag har deltagit i [utbildningen].
    2. Jag kommer troligtvis få mer intressanta och mer stimulerande arbetsuppgifter nu när jag deltagit i [utbildningen].
    3. Att jag deltog i [utbildningen] kommer inte att göra någon skillnad för hur intressant mitt arbete är.
    4. Jag utvecklades eller kommer troligen att utvecklas som person av att ha deltagit i [utbildningen].
    5. Jag blev eller kommer att bli en bättre person av att ha deltagit i [utbildningen], både i och utanför jobbet.
    6. Att delta i utbildningen stärkte inte mitt självförtroende eller självkänsla.
    7. Det var givande för mig att delta i [utbildningen].
    8. (This item of the original scale was not applicable in this study.)

Transfer, motivation to transfer and learning

These scales were designed in line with how Axtell et al. (1997) designed their scales measuring transfer and motivation to transfer.

Wording of questions:

Learning - I vilken grad anser du att du, under kursen [utbildningen], *lärde dig* följande:

Motivation to transfer - Vid kursens slut, hur *dedikerad* var du att hitta sätt att tillämpa samt tillämpa följande kunskaper och färdigheter i ditt arbete?

Transfer - I vilken grad anser du att du *har tillämpat* eller tror du att du *kommer att tillämpa* följande kunskaper och färdigheter i ditt arbete?

Learning outcomes:

The respondent where asked to answer the above questions regarding the following learning outcomes.

Partnering

1. Förståelse för varför NCC satsar på partnering.
2. Kunskap om vad partnering innebär..
3. Förståelse för vad kunden får i partnering.
4. Förmåga att prata och agera bra partnering.

Cost control

1. Förståelse för vikten med en korrekt projektrapportering.
2. Färdighet i att tillämpa NCC:s verksamhetssystem för ekonomistyrning.
3. Förmåga att uppdatera en aktuell budget
4. Förmåga att göra en avstämning och prognos

Introduction email

This is the first email that was sent to the participants in the courses.

> Ämne: *(Svara senast 6 mars) Enkät: Hur kan kursen XXX göras mer användbar*?
>
> Hej!
>
> Som en del i utvecklingsarbetet av våra utbildningar genomförs just nu ett examensarbete med syftet att förbättra effekten av utbildningar så att kurserna kommer till största möjliga nytta.
>
> Du har fått detta mail för att du deltagit i kursen XXX. Nu behövs din hjälp för att undersöka effekten av utbildningen samt vilka faktorer som kan påverka huruvida kunskapen från kursen tillämpas i arbetet. Enkäten tar cirka 10-15 minuter att svara på och självklart kan du få ta del av det slutliga resultatet om du så önskar. Skriv i sådana fall in din mailadress i slutet av enkäten.
>
> Denna länk tar dig till enkäten: LÄNK
>
> Tack på förhand!
>
> Många hälsningar,
>
> Annie Gjers, Exjobbare på Utbildning

Reminder email

This is the reminder email that was sent to the all participants in the courses.

> Ämne: *(Svara senast 6 mars) Påminnelse om enkät: Hur kan kursen XXX göras mer användbar?*

Hej!

Om du redan har svarat på enkäten “Hur kan kursen XXX göras mer användbar?” ber jag dig att bortse från detta mail och tackar dig än en gång för ditt deltagande.

Detta mail är en påminnelse om att svara på enkäten “Hur kan kursen XXX göras mer användbar?”. Ditt deltagande är viktigt för utvecklingsarbetet av utbildningar och jag vore tacksam om du ville bidra med dina svar innan veckan är slut, senast nu på fredag.

Denna länk tar dig till enkäten: LÄNK

Vid frågor eller synpunkter, vänligen kontakta mig, Annie Gjers, på annie.gjers@ncc.se.

Många hälsningar,

Annie Gjers, Exjobbare på Utbildning

APPENDIX II – THE MANUSCRIPT TO INTERVIEWS

The following questions form the manuscript to the interviews with enquirers. The interviews were conducted in Swedish and therefore the questions below are in Swedish as well.

Respondenten:

- Vad heter du?
- Vad har du för roll inom NCC?
- Hur länge har du jobbat som det?
- Vad innebär den rollen?
- Vad är din roll när det gäller Partnering/Ekonomistyrning?
- Hur länge har du arbetat med den här kursen?
- I vilket stadie började du arbeta med kursen? Vad var kursens status när du började arbeta med den?
- Hur mycket kan du påverka kursens innehåll?
- Hur mycket kan du påverka kursens varande?

Kursen:

- Hur länge har kursen funnits i sin nuvarande form?
- Fanns den i en annan form tidigare?
- Vad handlar kursen om?
- Hur genomförs kursen?

Det lilla perspektivet:

- Vad vill NCC se för effekt hos den enskilda medarbetaren efter kursen?
- Kan du ge exempel på hur medarbetaren förväntas ändra sitt beteende?
- Vad tror NCC att medarbetare förväntar sig av kursen?
- Vad får medarbetaren för att ha deltagit i kursen? Det vill säga, vad tjänar medarbetaren på att ha deltagit i kursen?
- Varför tror NCC att medarbetaren deltar i kursen?

Det stora perspektivet:

- Varför började NCC hålla i kursen? (dåtid)
- Vad hoppas NCC att kursen ska bidra med till organisationen? (långsiktiga mål)
- Vilka effekter kan man se av kursen i dagsläget? (nuläge)
- Har de långsiktiga målen förändrats över tid eller hållits stabila?

APPENDIX III – PERMISSIONS TO USE THE SCALES

In this study the scale of Maurer et al. (2003) and Axtell et al. (1997) have been used. Here are the email conversations with the researchers giving their permission to use the material.

Axtell et al. (1997)

Annie Gjers <anniegjers@gmail.com> 7 januari 2015 16:35

Till: C.M.Axtell@sheffield.ac.uk

Dear Professor Axtell,

My name is Annie Gjers and I'm currently doing my master thesis at Chalmers University of Technology in Gothenburg, Sweden. My thesis is about the relationship between transfer of formal work-related training and some of the transfer antecedents that have been found in previous research.

I've read your article *Predicting immediate and longer-term transfer of training* (1997) and your research is very similar to the investigation I want to do. To make my investigation more reliable I'm looking for a well-tested instrument to quantitatively measure the antecedents, and the questionnaire you used in the research mentioned above seems to qualify greatly. My question to you is if you would give me your permission to use parts of your questionnaire in my master thesis. I would greatly appreciate it.

Sincerely,

Annie Gjers
Student at the master's programme Learning and Leadership
Chalmers University of Technology, Gothenburg, Sweden
annieg@student.chalmers.se or anniegjers@gmail.com

Annie Gjers <anniegjers@gmail.com> 14 januari 2015 10:43

Till: C.M.Axtell@sheffield.ac.uk

Dear Professor Axtell,

I would greatly appreciate it, if you could reply to my previous email as soon as possible, preferably within this week. There are some choices to make regarding my research and your reply is important for my decisions.

Thank you in advance.

Sincerely,

Annie Gjers
Student at the master's programme Learning and Leadership
Chalmers University of Technology, Gothenburg, Sweden

annieg@student.chalmers.se or anniegjers@gmail.com

Carolyn Axtell <c.m.axtell@sheffield.ac.uk> 14 januari 2015 11:28

Till: Annie Gjers <anniegjers@gmail.com>

Hi Annie
Yes, it is fine to use the instruments used in that paper as long as they are cited appropriately. I think most of them were from other sources anyway.
Good luck with your research.
Best Wishes
Carolyn

--

Carolyn Axtell, PhD
Senior Lecturer
Director of MSc Occupational/Work Psychology
Institute of Work Psychology
Sheffield University Management School
Conduit Road, Sheffield S10 IFL
0114-2223267

Maurer et al. (2003)

Annie Gjers <anniegjers@gmail.com> 7 januari 2015 16:37

Till: tmaurer@gsu.edu

Dear Professor Maurer,

My name is Annie Gjers and I'm currently doing my master thesis at Chalmers University of Technology in Gothenburg, Sweden. My thesis is about the relationship between transfer of formal work-related training and some of the transfer antecedents that have been found in previous research.

To make my investigation more reliable I'm looking for a well-tested instrument to quantitatively measure the antecedents of training transfer, and some of the scales you used in the following articles seem to qualify greatly:

- Investigation of Perceived Environment, Perceived Outcome, and Person Variables in Relationship to Voluntary Development Activity by Employees (1994)
- A Model of Involvement in Work-related Learning and Development Activity: The Effects of Individual, Situational, Motivational, and Age Variables (2003)

My question to you is if you would give me your permission to use parts of your questionnaire in my master thesis. I am particularly interested in the scales measuring perceived outcomes/benefits. I would greatly appreciate it.

Sincerely,

Annie Gjers
Student at the master's programme Learning and Leadership
Chalmers University of Technology, Gothenburg, Sweden
annieg@student.chalmers.se or anniegjers@gmail.com

Todd J Maurer <tmaurer@gsu.edu> 7 januari 2015 18:01

Till: Annie Gjers <anniegjers@gmail.com>

Sure…here you go. Good luck with your research.

Todd Maurer