Requirements for Effective Professional IT-Training: A Case Study

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Abstract: In companies, it is common practice to provide continuous training and skill enhancement. Unfortunately, this is often done without comprehensive pre-evaluations of requirements for coming tasks and suitability for the participant. Moreover, companies attempt to reduce overall costs by booking training units for larger groups; independent of needs, pre-knowledge, or working area of the participants. Thus, continuing training is covered but often it is more time-off-duty than effective time for sustainable training. In this paper, we analyzed almost thousand participants in an empirical study to understand the interdependencies of their background, course selection, tutor, course material, mode of learning; i.e. with respect to effectiveness and sustainability. The outcome shows the importance of pre-determining the requirements compared to other factors.

1 Introduction

The pervasion of information and communication technology (ICT) in professional and private life is continuously increasing over the last years. Studies show that in 2008 already over 60% of the employees have to use regularly computers at work; and the number of users at home is overwhelming with 76% (DESTATIS 2011). In addition, the speed of introducing new technology and software is increasing and forces the users to either work with not up-to-date products or have to invest time on understanding changes; i.e. new features, behavior, or handling. Whilst the motivation at home is left to one's own decision, the necessity at work to integrate and practice new ICT underlies further reasons within a more complex system. In a highly connected world, companies are obliged to secure an innovative level of their ICT to manifest or improve their market position; but with respect to all means like technology, application, and qualification of workers, experts, and executive. Thus, companies can only compete in the competition for innovation, if employees are well trained, qualified for their position, and motivated to fully perform.

Continuous (vocational) training is the key factor for success (Hummel 2001). Unfortunately, companies, managers and especially human resource managers are frequently not aware of the potential and often restrict training just for orientation at a new position. Otherwise, investments are withheld in times of *financial difficulties* or if it is not *demonstrated* that the training results in a gain of productivity and increased revenue (Meier 2008). In addition, granted vocational training is often done without comprehensive pre-evaluations of requirements for coming tasks and suitability for the participant. Moreover, companies attempt to reduce to overall costs by booking training units for larger groups; regardless of needs, pre-knowledge, or working area of the participants. Thus, continuing training is implemented, but often it is more time-off-duty than effective time for sustainable training; increasing the costs for training even more; without achieving the anticipated benefits.

Companies require *performance indicators* to justify investments in vocational training; i.e. for soft-skills (Hummel 2001). Feedback forms – provided after training or seminar sessions – test the satisfaction and immediate learning success, but further controlling instruments are generally missing; i.e. for controlling the sustainability over a longer time period. Planning, auditing, and controlling the training process can be used to verify the *Return on Investment* (ROI) or *Value of Investment* (VOI), which can manifest in many ways; e.g. higher motivation of employees and improvement of work quality; with respect to the overall strategy and reduction of errors. Most managers possess theoretical knowledge about training evaluation, but face problems to implement them as a result of limited resources like time and man power. In particular, it is important to detect and prevent inefficient and unnecessary training; i.e. if the course is taken for fun and without any strategic importance.

The paper continues with a brief introduction on how to evaluate (vocational) training and its sustainability. Regarding this, we discuss three model and performed two empirical studies; the first (preliminary) study at the University of Hamburg (22 participants) and the second in cooperation with New Horizons (training center for IT) with 966 participants. Section 3 describes the method, while the results are summarized in Section 4. The discussion in Section 4 includes two interviews with experts, who confirm the outcome and also elaborate the open challenges for an efficient training evaluation. Section 5 concludes with an outlook on our current research project.

2 Auditing the Training Success

Vocational training control and evaluation is becoming a critical concern for companies as the qualification of their employees directly decides over success or failure on markets; i.e. with the current short development cycles in IT. In this section, we briefly discuss the process cycle of training control and introduce some model for evaluation; see also Phillips and Phillips (2007) and Rae and Page (1999) for a review.

2.1 Training Control

Training control is about the benefit gained in relation to the anticipated goals and used resources, encompasses the goals set by the company and the employees. Therefore, it is an important instrument to measure the qualification, knowledge, and capabilities to act on competing markets. It is used for target- and result-oriented planning, designing, and controlling vocational training; either operative or strategic to move into new markets or keep an advantage in competition. Thus, it is not only about transparency (cost, outcome) but also applied for decision support. Meier (2008) assigns four functions: (1) information gathering (using key indicators from evaluations and feedback); (2) planning (calculating the financial requirements; e.g., cost for training and downtime of employees); (3) controlling (success according to planned expectations on the outcome); (4) steering (influence on what and how is trained). Besides the difficulty to plan, the training evaluation also has to handle qualitative targets to measure the success (not considering quantitative targets like costs or test results). In particular, soft skills like communication, collaboration, team leadership, or creativity are hard to express in a value or show their value not until a longer time period has passed.

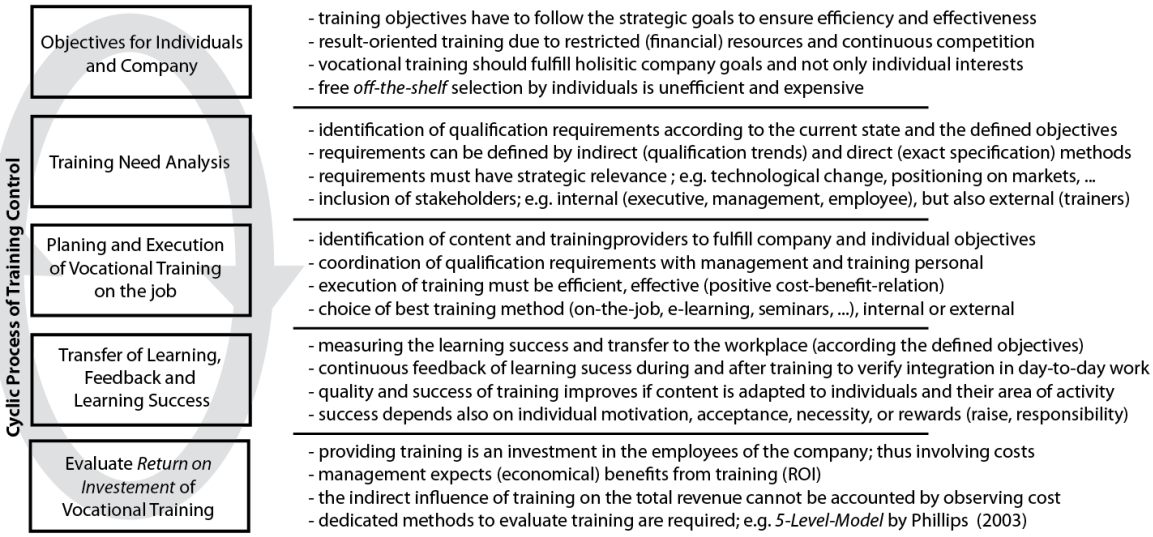

Figure 1: Five phases of the training control (cycle); see Phillips and Schirmer (2005)

Training control is a cyclic process and covers in general the *evaluation* (of the current situation), the *planning* (of training activity), and its *execution*. Figure 1 shows the five phases of the cycle and highlights the main activities in each phase; cf. Albers (2007) for more details.

2.2 Training Evaluation

The differentiation of training control and training evolution is disputable and still subject of discussions. Figure 2 depicts different features and demonstrates that both terms are neither synonym for each other nor can they be considered independently. In short, we agree to the distinction, that training evaluation is about one specific training

initiative (including the requirement planning and the (quantitative and qualitative) benefit for the company, while training control covers everything with respect to training; including strategic planning, resource management, qualification, and sustainability of training initiatives.

Training evaluation is about analyzing the quality and effectiveness; either formative (during the training through, e.g., feedback) or summative (after the training is finished); see Häring (2003) and Meier (2008). In the context of this paper, we understand that *training evaluation* is the systematic gathering and analysis of information about the training initiative and its effects on the participants (satisfaction, learning success, transfer of knowledge) and the company (changes in the context of the workplace, increased work efficiency and quality, higher revenue (e.g., ROI) with respect to given training goals).

	Tasks and Functions	Focus of Analysis and Process	Evaluation Criteria	Objectives	Integration	Perspective
Control	optimization of action; decision support; legiti-mation/integration	process-relational: parameter for input, qualification, process, and output; contin-uous process with linked cyclic	efficient and effective according to strategic objectives and needs	optimization and quality improve-ment of training processes; cost and resource controlling	planning, controlling, and steering of train-ing processes being part of management tasks (central/decentral)	continuous process; short-, mid-, long-term
Evaluation	planning, control, evaluation, plan-actual- comparision	process-relational: quality, efficency and sustainability of one training, temporal restricted, specific	goal and transfer oriented, learning success, and satisfaction	evaluation of benefits, monetary assessment of training investment, documentation, and proof of success	no management tasks, evaluation of processes of one training, internal and external evaluators	defined periods, generally short- or mid-term

Figure 2: Comparison of training control and training evaluation; see Gerlich (1999) and Schöni (2009)

Managers in charge for training initiatives have to evaluate the (potential) success to justify used resources (cost and time) and demonstrate the benefits. It is important to define indicators that map the training outcome to values like ROI. The disadvantage is that, in general, not all indicators are quantifiable. Certain factors cannot be measured, are triggers for larger effects, or become visible only after a longer time period. Thus, training evaluation requires different methods to collect subjective (interview, observation) and objective (exams, tests, surveys) information. Here, we are not able to describe the methods in detail, but briefly describe three models for training evaluation; see Phillips (2003) and Phillips and Schirmer (2005) for further reading.

The first and one of the most common models is from Kirkpatrick (1998). He assumes that the success of training can be mapped on four levels; each being further away from the training situation but more relevant for the company. The levels in his *four-level-model* are 1) reaction; 2) learning; 3) behavior; and 4) results; see Figure 3. The model, developed in the 50ies, assumes that the levels are linear and hierarchical connected; the dimension of a level depends on the level directly below. Later studies by Alliger and Janak (1989) showed that the correlation between one level and its immediate level below is just 0.15 and, therefore, a successful learning does not have to imply a (positive) behavioral change at the workplace. Nevertheless, the model is useful and provides a valid heuristic to evaluate training; see also Kirkpatrick Partners (2011) for further details.

Also shown in Figure 3 is the extension of Kirkpatrick's model by a fifth level *(Return on Investment)* and the process to perform the ROI analysis. According to ROI Institute (2011), only 10% currently evaluate the training above the first level; our interviews suggest that this results from the high costs for determining the ROI (Section 4 and 5). The process provides human resource managers with a detailed instruction how to evaluate the ROI and, in particular, gather relevant information and eliminate other factors influencing the ROI besides the training; e.g. changing markets or growing economy. Note that an ideal case to evaluate the training is a control group, but almost impossible to realize as it is difficult to 1) find identical groups beforehand; 2) isolate the control group, such that training results are not passed on to the control group; and 3) both follow the same scenario to evaluate the different outcome. Another problem to calculate the ROI is the transformation of qualitative factors into monetary values. Philips (2003) suggests different categories of data (hard; e.g., productivity, time, cost, quality; or soft; e.g., working climate and behavior, attitude, initiative, development, satisfaction) and methods how to calculate or estimate the value. The model itself is widely accepted; i.e. as it encompass the advantage of the original model (e.g., choosing the required level for evaluation) but integrates business terminology and therefore understanding among managers. The model still bares many problems and critics. For example, the calculation of the ROI is simple and does not

consider all factors. And many trainers and managers fear the outcome as a negative ROI would cause consequences and might result less training initiatives for the employees. Nevertheless, the model is known and applied in many companies (ROI Institute, 2011).

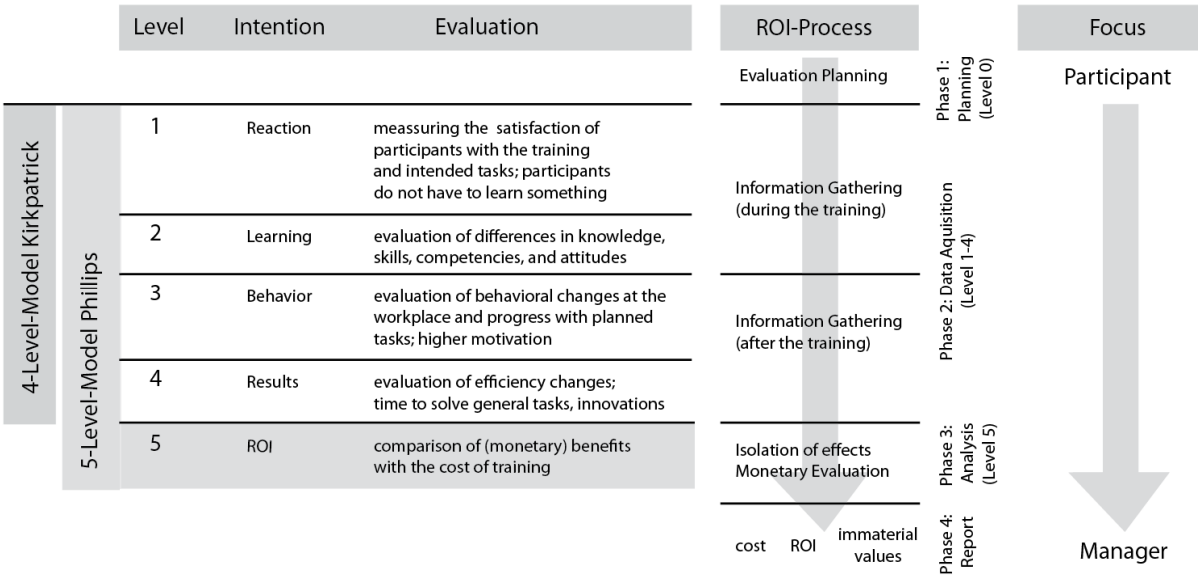

Figure 3: Four-Level-Model by Kirkpatrick and the extension by Phillips. Furthermore, the ROI Process is shown

Concluding the section, the *Value of Investment System* (VOIS) should be briefly mentioned as it counters the problem of negative ROI, which should not imply a stop for the training as qualitative criteria are not fully considered by ROI. The VOIS is an extension to the *five-level*-model by Philips (2003); i.e. with respect to an effective training control. It is important to align the training with the global business objectives and to measure the qualitative added value to justify the success or failure of training initiatives. Keller (2006) argues that without VOIS, managers would know about the importance of medium- and long-run effects by providing proper training, but have no adequate tools to calculate them. Figure 4 visualizes a comparison of measured values for ROI and VOIS; see Keller (2006) for more details on VOIS. Note that the calculation of the ROI is by far simpler than determining the long-run effects, which requires a high degree of qualification and understanding of training effects on the business objectives.

	Company	Employee	Customer/Partner
ROI	- low production cost - increased revenues - better margin of profit - larger market share	- more sales calls - shorter reaction time - less down time - increased productivity	- lower customer complain rate - more recommendations - better payment behavior - lower customer migration
VOIS	- increased innovation speed - optimized work climate - improved awareness of cost - more information for decisions	- higher motivation for quality - effective usage of work time	- higher customer satisfaction - improved cooperation - improved service - better qualification

Figure 4: Comparison of the measured values for ROI and VOI

3 Method

At first, a search of available studies revealed a broad coverage in theory and practice of training evaluation but few focus on IT-training; see Hartmann (2008). This is surprising as IT knowledge is required as a tool in most companies. In preliminary interviews with people being in charge for IT training in companies, we received manifold arguments: 1) no knowledge about IT training evaluation (as it is not the main source for revenue); 2) how the training evaluation can be done; and 3) the evaluation is waste of money. In particular the latter argument motivated our extensive empirical studies to analyze the effects of training evaluations and its implication on the company.

The complete survey had the following five phases: 1) beforehand, we conducted a smaller field study in a seminar at the University of Hamburg; mainly to evaluate the effects of training procedures and to gain further insight for the questionnaire (which questions are important and necessary to evaluate the training outcome) to be used in the later study; 2) in a following round table with experts, we refined the questionnaire such that theoretical as well as practical interests are covered and the length and structure is applicable for the larger empirical study; 3) randomly selected participants were asked before and after their IT training about their expectations and estimated (individual) success (quantitative analysis of parameter values); 4) the results were analyzed and used to acknowledge or reject hypothesis, that we did establish in advance together with the (training) experts; 5) verification if the outcome matches the expectations of IT trainers and (human resource) managers in companies, and derivation of implications on training in companies and suggestion for future training evaluations.

3.1 Field Study at the University of Hamburg

In a seminar with 22 participants, we introduced an intermediate 5-minute oral presentation to countervail problems students show at the final presentation despite a good written essay. The conducted experiment included: 1) a recording as well as analysis of the strength and weakness within the 5-min presentation; 2) creating and presenting a course *How to Present Scientific Research* based on the analysis (obligatory, 17 of 22 students participated); and 3) observation of the students to qualitatively evaluate the impact of the training. In addition, form sheets were used by the supervisor and trainer to evaluate the 5-min and final presentation with respect to methodology knowledge, presentation of the subject, interaction with the audience, and choice of media.

The obligatory course used the recorded 5-min presentations to discuss the status-quo (positive and negative examples) and to present techniques how to enhance the slides, include other media like flip chart, interact with the audience, and, most important, what to do with the body (gestures, voice, language). Students were (extrinsic) motivated as they understood the course as an investment in the future and a chance to improve the final grade. Indeed, all participants of the course showed in the final presentation (two weeks later) significant improvements (mainly in presenting the material, clear language without stop-words, integrating the audience), such that adviser were able to identify (without knowledge about who took the course) 15 of the 17 students. None of the other 5 students showed a significant improvement.

With respect to the empirical study, the statistical analysis is irrelevant compared to the lesson learned for the methodology, questionnaire, and potential hypotheses to investigate. Through feedback from the students, we identified the following factors for a successful training, which are measured on the first three levels *Reaction* (satisfaction of the participants), *learning* (improvement of the grade), and *transfer* (course experience was applied in the final presentation): motivation, *voluntary* participation, preparatory knowledge and training, previous experience, level of education, and gender. For the last two factors, the field study gave only small indications as the group was almost homogeneous.

3.2 Empirical Study at New Horizons

The empirical study was done in cooperation with New Horizons, one of the largest providers of IT training in over 50 countries. The large variation of IT training allowed us to collect a large sample for the field study and get access to a large statistical database of training evaluations (filled out anonymously by course participants after the training). The course trainers supported us with the coordination of the field study by passing out the questionnaires and collecting the data. In addition, trainers as well as managers of New Horizons participated (among others) in the expert interviews and interpretation of the outcome with respect to (future) IT training (at New Horizons).

Prior to the study, the experts mentioned problems, which might influence the overall quality of IT-training and should be investigated. That is, 1) the late integration of the IT-trainer in the planning process (requirement analysis); 2) training success is generally evaluated at the training center (satisfaction), but not the sustainability within the company; and 3) human resources managers are not interested in sustainable training evaluation. The questionnaire (Section 3.3) is derived from the lesson learned in the field study (main factors and how can we measure them) and the statements from the experts. With respect to a large number of answers, we chose an anonymous paper-based questionnaire before and after the IT-training, passed to the participants by the IT-trainers. We had no influence on the participants in the courses (gender, age, prior knowledge of the subject, educational background, company, motivation to take the course, …) and the selection of courses was based on availability and acknowledgment of trainers. Therefore, we consider the participants to be random in accordance for an experimental design. We decided

not to use a control group due to the difficulties finding a qualified one where comparison is possible; e.g., no communication between the groups, same tasks in the same context. Nevertheless, we are currently initiating a project to further explore the sustainability of IT-training, which will involve different control groups.

3.3 Questionnaire

As mentioned above, we used two different questionnaires; one before the IT-training (training expectations) and one afterwards (training evaluation). While the first one was designed by the authors, we decided on the tool *Metric that Matters* by New Horizons for the second one. This questionnaire is used at all locations of New Horizons and was continuously improved over the last 30 years to evaluate the training. In addition, the participants have only one additional questionnaire in the beginning as the training evaluation is done independently to our study; while the questions are in accordance with our experimental design. The medium *paper* was chosen due to simplicity: participants meet in a classroom, extra time to complete the questionnaire is given, visible anonymity. The results, including demographic data about the participants, are given in Section 4 and discussed in Section 5.

3.3.1 Training Expectations

The first questionnaire is decisive for the success (return rate, completion) and, therefore was designed to 1) motivate the participants by being easy to understand (terminology, language, clear instructions), well-structured (sorted by subjects following a general thread throughout the survey), short (single double-sided page), and well-grounded (research work, improvement of future IT-training); and 2) guaranteeing anonymity (no traces to the participant) and security (no individual information is given to the companies of the participants); and 3) correspond with the second questionnaire (evaluation, matching pre- and post-opinions). Each question has the option *no answer* (participants should not be forced to answer) and we used no *open questions* to reduce the process time (for participants and us). The questionnaire had the following parts: demographic data, motivation for the IT-training, expectations, and planned outcome.

Demographic data consists of gender, educational background, experience with computers, position at work (manager, employee, private). For the *motivation*, we used predefined reasons with a scale from 1 (disagree) to 9 (agree): 1) has current problem; 2) new abilities for work and private life; 3) preparation for changes at work; and 4) forced to participate. The expectations were split in two parts: First, we asked for expected improvements in using the software (the course is about) and being more efficient after the course. Second, we asked for the area of expected positive effects; i.e. quality of work, productivity, innovation potential, efficiency, revenue, cost, satisfaction (of colleagues and customers). Finally, we asked for intended learning success (scale from 1 to 9): 1) participation is a valuable investment for the professional career; 2) learned material can be transferred to the daily work life; 3) inspiration to use the software in different ways; and 4) increased efficiency using the software.

3.3.2 Training Evaluation

The second questionnaire was passed out to the participants after the training and consists of six parts: 1) environment; 2) trainer; 3) course material; 4) general satisfaction; 5) learning success; and 6) implication of participation. The last two parts correspond to the first questionnaire and are used to verify if the expectations are fulfilled or not. All but one question use a scale from 1 (disagree) to 9 (agree) as well as a *no answer* field. The question about satisfaction has four possible exclusive answers: very satisfied; satisfied; unsatisfied, very unsatisfied. In addition, each part has an open answer field for comments from the participants. In our preliminary study, we did not use these fields but have all answers transferred to New Horizons for further evaluation. In specific, the part *context* is about the atmosphere and technique; the part *trainer* asks about qualification, presentation, quality of responses, helpful with respect to questions, integration of practical examples; the part *course material* is about covered subjects, structure, examples, complexity, quality; the part *satisfaction* was only about the overall satisfaction; for the other parts see Section 3.3.1.

4 Results

4.1 Demographic Data

A sample of 966 (48.2%) out of a pool of 2006 individuals, who were asked to participate, completed the two questionnaires. The sample (N = 966) comprised 58.18% (n = 562) females. Figure 5 presents the demographic variables (frequency and percentage with modal categories marked with bold lines). The educational background shows a homogenous distribution among different school types, and *apprenticeship* (approx. 20-24%), while 31.3% (n = 302) have a university degree. Considering the gender, the discrepancy results mainly from the large number of

males with university degree (38.4% of the males compared to 26.2%), while the modal for the females is *secondary school* (27.2%). A majority of the participants (91.8%, n = 887) have 5 or more years of experience with computers (and software), with almost no gender difference (male 91.09%, female 92.35%). A distinction (not shown here) shows that the experience correlates with educational background; e.g., participants with university degree have far more experience than *secondary school*. With 60% (n = 588) working 5 or more hours per day and 21.8% at least 2-5 hours, participants spend a large portion of their work time with computers. In contrast to these values, the modal for the duration using a computer at home is <2 with 23.1% (n = 223); not counting missing answers. n = 40 (0.41%) declared to be IT-specialists and n = 114 (11.4%) to be in a leading position.

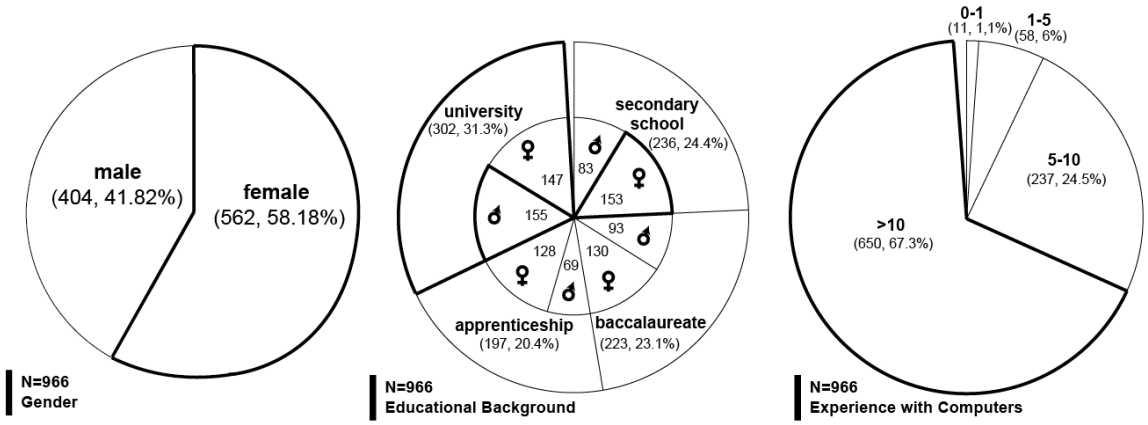

Figure 5: Demographic data of the participants

4.2 Training Expectations

The field study suggested that motivation has the largest influence on the learning success and resulted in questions about the motivation to choose the IT training. All answers had an average of approx. 4, expect Answer 2 (*new perspectives with the software)* with 8.11. Note, that that the new perspective is rated higher by females (8.36 vs. 7.76) and males agree more on being forced to participate in the training (4.43 vs. 3.55).

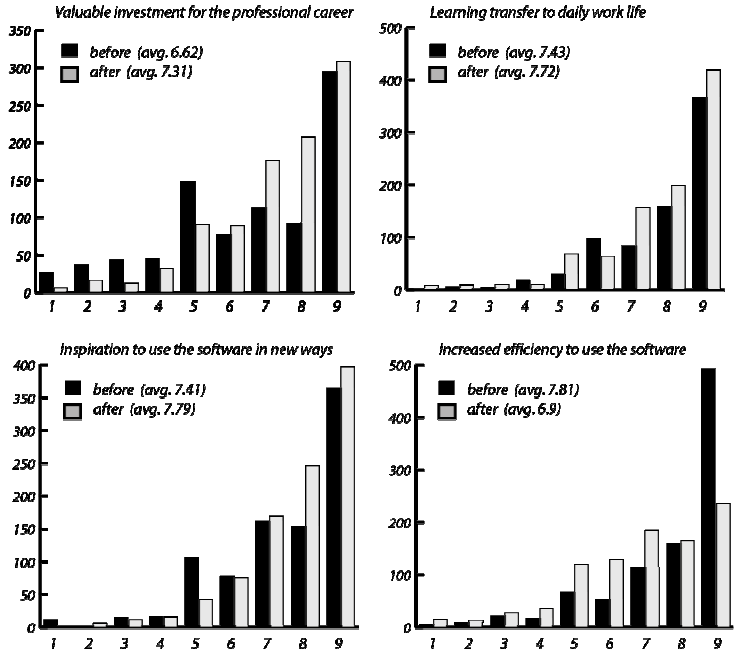

Figure 6: Expectations before and after the training. The X-axis shows the rating the participants had to use (1-9)

We asked for the areas in which participants expect a positive effect for their work (sums to > 966 as participant could choose more than one answer). The categories with the highest frequencies are *finishing the task faster* (n =

794), *higher productivity* (n = 562), and *higher quality* (n = 481), while categories with the lowest frequencies are *higher revenue* (n = 35) and *reduced cost* (n = 71). The same question was asked after the training, whereas the highest frequency is still *finishing the task faster* (n = 729), the next two switched position (higher quality with n = 487 and higher productivity with n = 480). The lowest frequencies are still *higher revenue* (n = 25) and *reduced cost* (n = 71). The software of the training is used by 43.5% (n = 411) more than 50% of the working time, whereas n = 633 have an expectation of improving their knowledge about the software by more than 50%; after the course the number is even increased to n = 754 (78.05%). In comparison to the improvements regarding the software, the overall effects on the work efficiency is rated lower (in average): 36.35% (and 36.61% after the training). If the expectation is related to the experience with computers, the improvement ranges from 50% (0-1 year) and 35.11% (over 10 years). Note that over 90% have 5 or more years experience with IT. The same outcome was observed after the training, with a lower value for the inexperienced participants (42.5%). Finally, we asked for the anticipated learning success. Figure 6 visualizes the frequencies for the four options for all groups. Note that for the first three options, we have a shift towards a higher grade (agree), whereas the *increased efficiency* is the only one with a shift to a lower grade.

The questionnaire at the end of the course asked to estimate further influences on the outcome of the training; e.g. context, trainer and course material. With respect to the focus of this contribution and the message, the results are not discussed in details here (but can be requested from the authors; see also Fuchs (2010). Nevertheless, we put forward three hypotheses and evaluate their acceptance or rejection. The hypotheses are:

1. The evaluation of the learning success depends on the rating for the trainer
2. The general satisfaction depends on the level of the course
3. Participants apply learned capabilities at their workplace if it was new to them during the training

The analysis of the data (N = 966) resulted in rejection of the first hypothesis[1], weak acceptance[2] of the second and strong acceptance[3] of the last one. On the one hand, the results are interesting and cause training provider to rethink their strategies; on the other hand, the results are not surprising; see the next section for further discussions.

5 Discussion

The results presented in Section 4 were discussed with different experts; including the data used for the hypotheses not being shown in this paper. Starting with the demographic data, we expected the given gender distribution, but not with respect to the experience in IT with over 5 or more years. With more than 340 participants in introducing courses, we expected to have starters with no experiences. This could be an indication that the course was not selected based on pre-knowledge, experience, and required training to improve the efficiency of work. Note that participants expected to achieve this in the course (Figure 6 (bottom-right); avg. 7.81), which was not fulfilled afterwards (avg. 6.9). Nevertheless, participants considered the courses to be successful and above expectation as all other averages increase. During the discussion, we analyzed this phenomenon further and came to the conclusion that in our sample, most of the participants use only small set of available functions for their (repeating) tasks. In the way they were introduced to their work. Thus, the training showed them new ways to use, e.g., software; and they were looking forward to apply the lesson learned later in the company or at home.

The low correlation between trainer and learning success should be considered as a very positive outcome. Obvious, the trainer qualification requires a high level, but it reduces inter-personal issues (emotions) and allows setting the focus on the content. It also tells us that the participants are highly motivated and participated to learn something rather than enjoying the time away from the workplace. We consider the level of *forced to take a course* to be low as no employee could or would take additional training; if not *requested* by the employer. Note that we found *motivation* as one of the key factors for successful learning from the field study.

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[1] The correlation *Trainer Evaluation* and *Average Learning Success* is .327, the t-test with α=5% is T=25.354 (df=963, x=1.08935, σ=1.334, $[1.00503;1.17367]_{0.05}$)

[2] The X^2-test with α=5% shows a asymptotic significance of α^*=0.293. The weight of the contingency is calculated with Cramer and shows with a value of .061 only a weak contingency.

[3] t-test with α=5% is T=1.543 (df=938, x=.08, σ=1.586, $[-.022; .181;]_{0.05}$)

What are our suggestions to improve vocational training? Triggering the motivation is the key to success, so demonstrating the benefit for the individual employee as well as the company is most relevant. Here, revenue and reduced cost were the least important factors for the participants, therefore criteria like quality, productivity, and efficiency; eventually in combination with a reward system if work is done faster or better and, therefore, add to the revenue after all. In addition, the course selection should be done together with the participant, the trainer (or someone planning the courses), and responsible managers to find the right mix of individual and company benefit.

Finally, the content design is important and should match the expectations of the participants; i.e. considering existing knowledge and specific needs at the workplace. Thus, the current transformation at New Horizons from large seminars to individual (e-learning) courses (with trainer nearby to discuss the course material and answer questions) is the right path to match all needs. Note, that in the interviews, we discovered a tendency to high expectations as a result of not being informed about the course. Therefore, the expectations are not coordinated with the trainer causing disappointment in the end.

6 Conclusions

For companies, it is essential that all employees are highly qualified in their field of expertise, including the usage of required IT tools. The pace of IT development increased over the last decades, such that a continuous training of new hard- and software is mandatory to stay ahead of competitors. But even though most companies are aware of the importance of training control from a theoretical point of view, it is seldom applied in a sophisticated matter. In interviews, we learned about the difficulty to reason expensive IT training (and the identification of requirements) without proof of sustainability, effects on efficiency, or higher revenues. In many cases, the *path of least resistance* is chosen: either find the common denominator for training need and book courses for several employees at once (e.g., in-house training) or give everyone a slice of the cake (with less money per employee). Identification of true training needs is rare, especially together with the trainer to agree on (individual) content and learning goals.

In this contribution, we presented a short introduction in training control (process cycle) and evaluation (three common models being applied to measure the success of training) and the results of our field studies and interviews with experts. To identify the importance of motivation on the learning outcome, we offered a course *How to Present Scientific Research* to a small group of students (seminar at a university) to improve their presentation skills. The evaluation of the final presentations as well as the feedback of the students showed, that 1) students taking the course improved significantly and 2) that the motivation increases in case of personal benefits through the training. The lesson learned was applied in the larger field study, where employees from different companies participated during their IT training at New Horizons. The questionnaires before (expectation) and after (experience) the training were analyzed to gain further insight about how IT training could be improved. The outcome was shown to experts to get a further point of view about the findings.

Most surprising, at least according to our expectations in the beginning, was the IT experience among the participants. We expected, that IT training (especially beginner courses) is chosen only by none experience people, which was also confirmed by training experts who currently address mainly people with none or little IT experience as a marketing strategy. It turned out, that participants do not expect to learn about new features but rather to understand the importance and relevance to enhance their daily work life. Therefore, the new strategy for IT trainers, managers, and employees is to identify and train the benefit rather than just features of the software. As a matter of principle, this summarizes the difference between practice and theory. While the theory

demands for individual training programs to achieve a positive learning outcome based on the needs, the practice is still lacking an implementation of this strategy as the quantification of the benefits is for most companies to laborious and expensive. But with stronger competition and need to react faster on new developments, a change of the training modalities, i.e. with respect to requirements, is essential.

In this contribution, we demonstrated the first stage of a larger project. In corporation with the training center New Horizons, we investigated background information about IT training to identify necessary actions to take in the future. Here, the focus was set on learning more about the participants, their expectation, and motivation. Further research is about creating tools to support human resource managers in their decision about who requires what kind of training, identifying the business, and integrating the IT trainer into the whole process to match requirements with the course content.

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