Project Deliverable Report

Deliverable nr D1 – Report on training needs and appropriation guideline per region and category

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Abstract (for dissemination) The HANDOVER project acknowledges that training and learning are important means to encourage the implementation of handover models and tools. This deliverable describes the training needs analysis, which can be considered as the first step in the design and delivery of training in handover. The training needs analysis encompasses the examination of training content, training design and conditions and prerequisites that affect the transfer of training from the training site to the workplace. A literature study and 18 interviews with training specialists working in hospitals in Spain, Poland and The Netherlands were used to collect information concerning the training needs. The report provides practical guidelines in the form of quality indicators that can be applied for decisions on the content of the training, for selecting the most appropriate training design and for establishing favourable conditions that increase the effectiveness of the training. The report concludes with some remarks concerning the further development of the quality indicators and the training in handover.

Keywords List Handover, training needs analysis, training design, transfer of training, quality indicators
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Chapter 1. Introduction

This deliverable is the first deliverable to be produced within workpackage 4 and also within the HANDOVER project. The deliverable describes the results of the analysis of the training needs of primary and secondary care doctors and nurses, regarding a training in handover. In addition, it provides more insight into possible cultural differences that may exist between European countries regarding training and learning matters. The outcomes of this training needs analysis will be used to develop a generic training in handover that can be customized to specific handover practices (e.g., emergency department, geriatrics) and to cultural preferences.

1.1 Background

The decreasing duration of hospitalisation and the increasing number of transition of patients between institutions and care services puts high demands on the quality of the handover processes of patients and especially of elderly patients, very young patients and high-risk patients with multiple co-morbidities (Halasyamani et al., 2006). Within the HANDOVER project, handovers involve either a patient’s referral to a hospital by a primary care specialist or a patient’s discharge from the hospital. During a referral or discharge the responsibility and accountability for the patient’s care is transferred from one clinical setting to another. Unfortunately, poor reports, incomplete handovers and communication errors can jeopardize the patient’s safety and can lead to adverse events, such as life threatening situations during surgery, avoidable treatment or rehospitalisation after discharge (Cheah et al., 2005; Simpson, 2005). Fortunately, hospitals and doctors increasingly recognise the importance of effective clinical handovers and are moving to improve their handover practices (Australian Medical Association). Moreover, the ‘action on patient safety: High 5s’ initiative of the World Health Organisation (2006) has identified 5 evidence-based solutions for patient safety of which two are related to handover: assuring medication accuracy at transitions in care and communication during patient care handovers. Furthermore, there is a growing recognition that enhanced training for effective and safe handovers are essential in maintaining high quality of care. Training of professionals is regarded as a powerful strategy to accompany the implementation of interventions such as increasing awareness and encouraging initial use of communications model and tools. In the HANDOVER project the content, design and implementation strategy of such a training is investigated by means of a training needs analysis.

1.2 The training needs analysis

The training needs analysis conducted in the HANDOVER project can be divided into three foci: (1) identification of problems to be solved and solutions to be trained (i.e., training content), (2) identification of suitable instructional design methods (i.e., training design), and (3) identification of prerequisites to assure effective training (i.e., transfer of training). In Appendix A, more information is provided on the concepts of needs, training and learning, and training for impact.
During the training needs analysis, four important viewpoints were taken into account. First, we take a broader perspective on the philosophy on training and learning. We do not only take care of the learning experience during the formal training situation, but also take into account the influence of the work environment of the training participants. This broader perspective is referred to as the training for impact approach. This approach acknowledges that more effort is needed to assure the long-term sustainable and appropriate use of what was learned during training (e.g., a communication model for handover, or the use of handover tools).

Second, the aim of the training needs analysis is not to develop a ‘one-size-fits-all’ training, but rather to develop a generic training which can be customized by training specialists to meet the needs of the training participants and the handover situations of the training participants. In order to customize this training, modules or building blocks (e.g., blue prints, examples of training formats, video clips) will be developed based on the guidelines based provided in this deliverable regarding content, design and transfer of training. In addition, a toolkit (e.g., checklists, questionnaires, guidelines) will be developed which supports the training specialist in decisions regarding what, why, how, where and when should be trained.

Third, the work of this workpackage can not be isolated from the work conducted in the other workpackages of the HANDOVER project. The investigation of contemporary handover practices by partners in workpackage 2, the work on selecting the handover model and its accompanying tools in workpackage 3, and the assessment of organizational climates by partners in workpackage 5 are just a few examples of work in other workpackages closely linked to the work conducted within workpackage 4. Especially the activities performed by partners in workpackage 2 and 3, will lead to decisions on the proposed handover model and tools, which are vital for the further elaboration of training and learning issues within workpackage 4.

Fourth, this deliverable provides a basis for the future work activities in workpackage 4 which include a) further elaboration of training design issues resulting in a blueprint for the generic training content, training tools, and its preferred training delivery modes, b) the actual development of the materials (i.e., building blocks, toolkit) based on the blueprint, c) piloting the materials accompanied by evaluations, and d) modification of the materials. The training needs analysis described in this report should therefore not be considered as a finalized activity, but rather as work in progress.

1.3 Method
Data for the needs analysis was gathered from two types of resources: a literature study and interviews with training specialists.

Literature study
The results of research on handover described in literature can provide a framework of common causes of ineffective handovers and directions for solutions to these ineffective handovers. To locate relevant publications, a literature search was conducted in a number of databases in both medical and educational domains such as PsyINFO, Academic Search Elite, Business Source Premier, Web of Science and Pubmed. For efficiency reasons, review studies were selected as a starting point of the literature search. Using a snowballing technique, publications of relevant research mentioned in these review
studies or other selected publication were consulted for more detailed information and included in the literature study.

To identify emerging topics and thinking patterns from the literature selected during the literature search cognitive mapping (Eden & Ackermann, 2003) was used. Cognitive mapping represents ideas and their relationships in the form of a causal or implication network of argumentation, which helps to identify clusters and most important concepts. An example of a cognitive map is provided in Appendix B.

**Interviews with training specialists**

To gain more insight in the requirements of a training in handover from the perspective of training specialists it was decided in agreement with the project management and project partners in workpackage 4 to conduct a series of interviews with training specialists. Participants for these interviews were selected by the project partners participating in workpackage 4: UMCU (The Netherlands), FAD (Spain), and CMJ/NCQA (Poland). A total number of 18 (i.e., 6 per participating partner) interviews were held with training specialist who were responsible for training staff in primary (n = 6) or secondary care in teaching hospitals (n = 9) or regional hospitals (n = 3). Because the interviews are conducted in three European countries, the interviews are also used to gain some insights in possible cultural differences between various European countries with respect to learning and training matters.

The interview scheme (see Appendix C) for the interviews was constructed in cooperation with all partners participating in workpackage 4. The final version of the interview scheme consisted of questions regarding a number of training design topics that are essential for designing training and learning in the context of handovers. These topics were: group composition, instructional activities, nature of the meetings, advantages and disadvantages of formal assessments and certification, how to increase motivation for training attendance, and how to assure transfer of training.

For the analysis of the interviews, a combination of content analysis and grounded theory was used. The interview includes specific questions about the experiences of the training specialists, which provide a basis for the content analysis categorizing. In addition, we identified themes, different from the pre-specified codes, which emerged inductively through the interview transcripts analysis (i.e., grounded theory). The results from the interviews are preliminary.

The planned interviews with representatives of workpackages 2 and 3 and the expert panel discussion are postponed because the data collection in workpackages 2 and 3, which would be an important topic of the interviews and panel discussion, is still running. Instead of conducting interviews it was decided to invite partners from all workpackages to participate in the development of the interview guideline and a questionnaire for the participants (i.e., primary/secondary care doctors/nurses) who participate in the focus group interviews that are planned within the activities of workpackage 2 (see chapter 3). As soon as more data is available and analyzed the interviews with representatives of workpackages 2 and 3 and the expert panel discussion will be held and results will be used to extend the training needs analysis.
Chapter 2. Results of the training needs analysis

This chapter provides an overview of the main findings of the three foci of the training needs analysis: training content, training design and prerequisites for transfer of training. A more extended description of the methods used for each of the foci and a more detailed description of the findings can be found in Appendices D to F.

2.1 Focus 1: Content of the training

Regarding the first focus of the needs analysis, the content of the training, it was investigated what factors contributed to problematic handover practices. Using cognitive mapping three main categories of factors could be identified: factors related to (a) those who are involved in the handover, (b) the handover process, and (c) organisational factors. Appendix D, section D.2, provides a detailed description of these factors.

The problems related to the first two categories can be tackled by means of training. The later category, however, is as important as the first two, but solutions to these problems go beyond training and therefore beyond the scope of the training needs analysis as such. With respect to the solutions to problematic handover that could be part of training in handover, three categories of solutions are presented in this report: (a) standardisation of the content of a handover, (b) standardisation of the process of handover, and (c) developing attitudes that encourage the correct use of handover solutions. The most important guidelines that can be deduced from these solutions are presented in Box 1. In Appendix D, section D.3, a detailed description of these solutions can be found. The most important conclusions of this focus of the training needs analysis, are that the training content should be rich (i.e., teaching both knowledge, skills and attitudes), and that the solution to ineffective handover practices (i.e., the content of the training) should be created by the those who are involved in the handover process (i.e., the training participants), in close collaboration with each other.

<table>
<thead>
<tr>
<th>Box 1. Guidelines for the training content</th>
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<tbody>
<tr>
<td>✓ Provide insight in how communication works</td>
</tr>
<tr>
<td>✓ Train knowledge, skills and attitude</td>
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<tr>
<td>✓ Train participants to customize a standard handover report form (co-creation of solution)</td>
</tr>
<tr>
<td>✓ Train participants to customize a standard handover procedure (co-creation of solution)</td>
</tr>
<tr>
<td>✓ Encourage co-creation of solutions to handover problems</td>
</tr>
</tbody>
</table>
2.2 Focus 2: Training design

The second focus of the needs analysis deals with all kinds of issues related to the design of training. Although the number of studies investigating the success and failure factors for handover is increasing, research on its educational aspects is rather limited and fragmented. The straightforward conclusion of the dedicated literature is that there is not a systematic approach to teach best practices in handover. However, based on the few studies that investigated the educational aspect of handover, several issues could be identified that should be taken into account when designing a training in the handover. In total, eight issues were identified which are summarized in Box 2. Detailed information on these issues is provided in Appendix E, section E.3.

<table>
<thead>
<tr>
<th>Box 2. Issues related to handover training</th>
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<tbody>
<tr>
<td>• There is not a systematic approach to teach best practices in handover.</td>
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<tr>
<td>• Implementation of clinical guidelines for handover is complex.</td>
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<td>• Training often focuses on individual cognition, neglecting distributed cognition (training the team).</td>
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<tr>
<td>• It is problematic to find a balance between supervision, service, and autonomy of training participants.</td>
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<tr>
<td>• Being a good professional does not necessarily mean being a good supervisor.</td>
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<tr>
<td>• Learners are reluctant to ask for help.</td>
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<tr>
<td>• ‘Culture of blame’ rather than ‘reporting culture’.</td>
</tr>
<tr>
<td>• Impact of formal training on job performance is limited.</td>
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</table>

Regarding the design of the training, guidelines can be derived from (a) training approaches which have been specifically developed and used to improve handover – also in other high risk settings (e.g., oil plant, aviation), (b) training approaches in the medical domain, other than handover training, and (c) domain independent training approaches. Box 3 provides an overview of relevant domain-dependent and independent training approaches. An detailed description of these training approaches and their application within a training for handover is provided in Appendix E. The guidelines that can be derived from these training approaches are summarized in Box 4 and explained in more detail in Appendix E, sections E.4 and E.5. These guidelines also represent the most important findings of the second focus of the training needs analysis. It is essential to base the design of the training on core design principles of domain dependent and independent instructional design approaches and the design should promote both individual learning and team learning. Furthermore, training should be considered as
necessary to teach handover models and tools, but one should also acknowledge, and take into account during training design, that more is needed to assure long-term sustainable application of the implemented handover model. Training should not be restricted to formal training, but should also include incorporation of support in the work environment (e.g., Electronic Performance Support Systems, continuous learning; see Appendix E, section E.5), the redesign of the clinical system (see Appendix E.6), and use of interesting technology-enhanced learning solutions (e.g., Wikis and blogs; see Appendix E, section E.7) to assure long-term training effectiveness).

Box 3. Guidelines for training design

- Consider three modes of handover training design: formal training, support at workplaces and redesign of clinical micro systems.
- For handover training design, take into account both domain dependent and domain independent instructional approaches.
- Identify the core components of the domain dependent and domain independent instructional approaches and use them as a basis for an elaboration in designing handover training.
- Design training activities that support both individual cognitive processes and distributed cognition which is located in the interactions between people and technological tools in a particular context for accomplishing a complex handover activity.
- Design handover clinical guidelines to use them as either an independent instructional support for handover, or as part of a more elaborated instructional design model.
- Pay special attention to cognitive apprenticeship approach as it can be used for either formal training in handover, support at workplace or even redesigning clinical micro systems.
- Design a generic but adaptable handover training allowing for a flexible implementation in different settings and cultures.
- Technology is a powerful facilitator for handover training design but always consider it in a combination with an effective and efficient instructional approach.
- The project’s training design in handover would significantly contribute to formal training in handover and to support best handover practices at workplaces, but its role in redesigning clinical micro system is relatively limited.
2.4. Focus 3: Transfer of training

The third and final focus of the training needs analysis conducted in the HANDOVER project is related to the prerequisites to assure transfer of training to the workplace. Transfer of training is generally defined as the degree to which trained employees effectively apply the training content. For this focus it is investigated what factors influence the effectiveness of the training. There are several approaches to measure the effectiveness of training. The most famous one is Kirkpatrick’s Four level model (Kirkpatrick, 1994). According to this model, evaluation of training effectiveness consists of four levels: response, learning, performance and results. Box 4 provides an overview and description of these levels. Appendix F, section F.2, presents a more detailed explanation of the Kirkpatrick’s Four level model. In the HANDOVER project we strive to develop guidelines for a training which will be evaluated as an effective training with respect to the third level of Kirkpatrick’s model. That is, the training will be designed and implemented in such a way that it enhances the ability and willingness of training participants to retain the new knowledge and skills and to transfer these back to the daily job. For this purpose, it was examined what kind of conditions and prerequisites are essential to enhance the transfer of the training from the training situation to the workplace and increase the long-term correct use of handover models.

The various factors that affect the transfer of training are divided into three categories: training participants, training design and work environment. Box 5 summarizes the most important guidelines that could be derived from the analysis of factors that influence transfer of training. In Appendix F, section F.4 to F.7, these factors are explained in more detailed. The most important conclusions of the third focus of the training needs analysis are that measures should be taken both before, during and after the training to assure long-term use of trained models and tools. Furthermore, training design is essential, but it is not sufficient to assure the long-term correct use of handover models. Various factors within the workplace (e.g., support of co-workers and line managers, the organizational climate for training, learning and innovation) strongly affect the long-term effectiveness of training. At the same time these factors are difficult to change and require not only the involvement of training specialists but the involvement of other stakeholders as well.
2.5 Preliminary interview results

Overall, the results of the interviews with the training specialist confirmed the findings described in literature regarding the content and design of the training and prerequisites for transfer of training. No conflicting views on training and learning issues were observed between literature and interviews. However, the training specialists provide more detailed information on how to implement a training from a more practical point of view. The majority of the training specialists advised to train participants in heterogeneous (i.e., both nurses and specialist or specialist and general practitioners) groups with 12 to 15 participants. The training should last about 4 hours and assignments should be provided both before, during and after the training. These assignments should be used to enhance awareness of problematic handover practices, evoke critical self-reflection on current handover practices, enhance knowledge of how communication works and provide the opportunity to practice with communication models and tools. All of the interviewed training specialists stressed the importance of taking care of prerequisites to assure transfer of training, such as creating opportunities to practice in the workplace what has been learned during training, organize follow up sessions and put effort in stressing the importance of support and feedback by the management. The only aspect of the training, the training specialists did not always agree on, is the format of the training. Especially the use of role play/simulation and e-learning is not always considered equally effective by the training specialists. Especially in Poland and Spain training specialists mention role play as an effective training format, whereas the Dutch training specialists are more sceptic about the effectiveness of this format, explaining that participants will not feel comfortable with role play which might negatively influence the effect of the training. Also regarding e-learning, more Polish and Spanish training specialists mention this as an effective training format, compared to the Dutch training specialists.

Box 5. Guidelines for transfer of training

- Enhance similarity between training and workplace
- Select appropriate instructional design strategies
- Develop transfer intentions during training
- Organize follow up activities
- Take into account participants’...
  - prior knowledge and experiences
  - motivational aspects
  - learning style
  - learning preferences
- Organize support and feedback in participants’ workplace
- Arrange sufficient opportunities to perform and apply what is learned in the workplace
- Take into account the impact of the organizational climate for learning and transfer
Chapter 3. Conclusions and future work

In this first deliverable of the HANDOVER project, the training needs analysis for the development of a training in handover are described. In this deliverable it is explained what factors need to be considered during the process of designing, delivering and implementing of a training in handover. Based on the data collection at this stage of the HANDOVER project and the training needs analysis, it is possible to provide guidelines for effective training design and other learning events.

Regarding the guidelines that have been formulated, based on the training needs analysis, we would like to propose to use these guidelines as quality indicators for the effectiveness of training and other learning events. These indicators are based on sufficient and high quality information stemming from literature, grounded in research, complemented by interviews with training specialists in medical settings. The quality indicators can then be used as a checklist during training design and as assessment criteria for training evaluation. That is, in order to make a training as effective as possible, these indicators should be taken into account during the design and implementation of the training. With respect to training evaluation, the quality indicators can be used to judge the effectiveness of the training before actually implementing the training or to identify after training the factors that might have negatively influenced the effectiveness of the training.

We composed a list of quality indicators for effective training and other learning events, which is displayed in Table 3.1. The quality indicators pertain to the content or the design of the training or to prerequisites for transfer of training. In the next phases of the HANDOVER project the information displayed in Table 3.1 can be further elaborated and transformed into a checklist that will be incorporated in the toolkit that will be developed for training specialists.

In the process of the further development of these quality indicators some points need to be taken into account. First, it is important to distinguish between the training, or other learning events, and the intervention (e.g., implementation of the handover model or tools) as such. Training and learning can be regarded as powerful modes to enhance the implementation of handover models, however this means that training is supportive but is not in itself the actual intervention.

Second, it is essential that information becomes available concerning the final content of the handover model and the accompanying tools to (a) fine-tune the quality indicators, (b) develop building blocks for the training content, and (c) describe appropriation guidelines per category and region. That is, the outcomes of the current work activities performed in other workpackages (especially workpackage 2 and 3) are needed to support these activities within workpackage 4.

Third, as the quality indicators show, much of the quality of training and learning depends on factors embedded in the workplace. That is the ultimate effectiveness of training and learning lies in, for example, the presence of an encouraging climate, the responsiveness of team members and opportunities to apply at work what was learned.
Table 3.1 Quality indicators for effective training and learning events

**CONTENT OF TRAINING**

- **Content is customized to needs**: The content of the training is based on a training needs analysis.
- **Both skills, knowledge and attitudes are trained**: The training focuses not only on skill development, but also on knowledge construction and attitude change.
- **Alignment with prior knowledge and experiences**: The content of the training is aligned with training participants’ prior knowledge and experiences.
- **Co-creation of training content**: Training participants are involved in the design of the solution to handover problems.

**TRAINING DESIGN**

- **Training on the job**: Training is not restricted to formal training but also opportunities for training on the job are created.
- **Redesign of clinical Microsystems**: Training is not restricted to formal training, but effort is also put in redesigning clinical micro system.
- **Design is based on a mixture of instructional design principles**: Design is based on the kernel of substantial components of the domain dependent and domain independent instructional approaches.
- **Adaptable training design**: The training is generic but can be adapted to different settings.
- **Team training is included**: The training is designed to support both individual and distributed cognition. Team members work together, learn from each other.
- **Technology is the means and not the end.**: The technology used in a handover training should be used in a combination with an effective and efficient instructional approach.
- **Appropriate instructional strategies**: The activities used during training encourage the development of a flexible mental model of the handover process.

**TRANSFER OF TRAINING**

- **Opportunity to development transfer intentions**: During training participants are given the opportunity to think about how they will apply what is learned in their own workplace.
- **Support and feedback provided by managers and co-workers**: Managers, instead of trainers, emphasize the importance of training and set explicit training goals.
- **Clarity on training content**: Participants know what will be the content of the training and other learning events.
- **Similarity between training and workplace**: Training should match requirements of training participants’ daily workplace to increase the effectiveness of the training. Use authentic examples and simulations and maybe even on-the-job training.
- **Participants learning preferences are taken into account**: Participants are facilitated and encouraged to engage in new, unknown modes of training and learning.
- **Opportunities to perform after training**: Sufficient opportunities are created after the training to allow training participants to apply what was learned during training.
- **Adjustments in the organizational climate**: Managers are informed about the importance of the organizational climate and are offered guidelines to improve the climate for innovation, training and continuous learning.
- **Training is evaluated at the four levels of Kirkpatrick**: The reactions (level 1) and learning outcomes (level 2) of participants are evaluated directly after training. In addition workplace performance (level 3) and the organizational results of working with the new handover model (level 4) are evaluated.
- **Follow-up activities are organized**: After training follow-up activities are organized in the workplace.
during the training. This does not imply that conventional training factors are unimportant but that more is needed to guarantee the long-term sustainable application of the new handover model in daily practice.

Though the work so far was very fruitful, in the perspective of the ultimate goal of this workpackage it is necessary to further elaborate on and fine-tune the quality indicators. We therefore intend to perform the following activities in the upcoming months:

- **Conduct additional interviews with training specialists**
  The 18 interviews conducted with training specialists so far contributed to deepen and broaden the understanding of appropriate training design. Because these interviews were quite valuable, it has been decided to conduct a total of 18 additional interviews in Poland, Spain and The Netherlands. The total number of interviews will then be 36 interviews: 12 in each country, 4 per training specialist category (i.e., 4 within primary care, 4 within a teaching hospital, and 4 within a regional hospital). This enables us to draw more firm conclusions regarding the cultural differences in training content, design, and prerequisites for transfer of training.

- **Questionnaire on training for primary/secondary care doctors/nurses**
  In order to gain more insight into training preferences of training participants (i.e., primary/secondary care doctors/nurses) a questionnaire has been developed for the participants of the focus group interviews conducted within workpackage 2. These focus groups are scheduled during the autumn of 2009. The questionnaire will be filled out by the participants prior to the focus group interview. In this way a large amount of data can be collected in an efficient and effective way.

- **Interview representatives of workpackage 2 and 3**
  As soon as the partners in workpackage 2 and 3 have finished their data analyses, they will be interviewed to fine-tune the quality indicators and to gain more insight into solutions to handover problems (i.e., training content).

- **Expert panel discussion on training needs analysis**
  After all the abovementioned data is gathered by and from the partners in workpackage 4, 2 and 3, the quality indicators can be fine-tuned and will be presented to experts of various European countries to ensure successful cross-cultural implementation.

To conclude, this deliverable reflects the first steps of the process on designing learning and training in the HANDOVER project. It is expected that training and learning will contribute significantly to implementing high quality and sustainable solutions for handover problems. However, at the same time it is recognized that training and learning is just one viable component in the entire approach to increase the quality of handover practices. Nevertheless, high quality training and other learning events are necessary and essential to increase the success of solutions for handover problems.
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Appendix A. An introduction to training needs analysis

This appendix outlines the main principles that guided our work for this report. First, attention is paid to the description of the concept of training needs analysis, followed by some comments on the proposed approach for the design and delivery of learning.

A1. What needs and whose needs should be analysed?

The main issue in this report concerns the identification of needs for training and learning. The notion of needs refers to defining where and why training is needed, who needs to be trained, and what should be trained (Dierdorff & Surface, 2008; Salas & Cannon-Bowers, 2001). According to Rosset (1987) needs refer to different levels: the organizational needs (what is the problem or challenge to deal with), the needs provided by an analysis of jobs/tasks (to examine discrepancies between actual and optimal performance, their causes and possible solutions) and it refers to all kinds of characteristics of the training audience (for example their confidence level, prior knowledge, learning styles). Thus in summary, the concept of needs does not limit the focus on the training as such but also takes into account all kinds of conditions and prerequisites that are essential to enhance the effectiveness and efficiency of training and other learning events.

Needs differ in their consequences for the design and delivery of learning and training (Holton, Bates & Naquin, 2000). For instance, not every need can be considered as a rock-hard need; some needs are more likely preferences that can be modified in the course of designing and delivering training and learning. When employees, for example, are used to attend lectures in a classroom setting it is likely that they will express some resistance against other instructional formats, (for example e-learning) but that does not mean that e-learning as such is not appropriate, rather it implies that more effort must be invested to examine what causes this resistance and how to deal with this when e-learning is chosen as instructional format. This example underlines that needs analysis usually does not result into simple straight-line design decisions, rather it offers rich food for thought for designing well thought-out training and other learning events.

A2. The needs analysis

A needs analysis comprises two main processes. During the first process data is collected and during the second process the data is interpreted and assessed to draw conclusions for the design and delivery of training and other learning events (see, for example, Holton, Bates & Naquin, 2000). The first process can be divided into three foci: (1) identification of problems to be solved and solutions to be trained (i.e., training content), (2) identifying suitable instructional design methods (i.e., training design), and (3) identifying prerequisites to assure effective training (i.e., transfer of training). This deliverable mainly describes the three foci of the first process; interpretations (i.e., the second process) are made at a generic level regarding training content, training design and prerequisites for effective training. More detailed and concrete interpretations of the data become more appropriate when decisions on the communication model and its accompanying tools/interventions are made by the partners in workpackage 3. This report
focuses on a broad discussion of needs that are further detailed and refined, including the consequences for training and learning, in the next stages of the HANDOVER project.

There are numerous instruments applied for the collection of needs analysis data. Interviews, questionnaires, observations in the workplace, literature search, document analysis are just a few examples of common instruments applied in needs analysis activities (Rosset, 1987).

A.3 Training for activity versus training for impact

Training and other learning events can only be successful when the following equation is kept in mind during the design and delivery (Robinson & Robinson, 1989, p. 11): “Learning Experience \times Work Environment = Results”. To achieve these results, it is not only important to attain a high learning experience, but also to take into account conditions of the work environment where the training content needs to be applied.

Traditionally, training and learning specialists dedicate their time and energy to increasing the quality of the learning experience. Training participants receive a high quality training delivered by skilled trainers and at the end of the training program they have learned everything they need to know. However, these training specialist often do not take into account that when the work environment does not encourage applying what was learned during the learning experience, results of the training are rather modest or even absent. For example, a training of maximum quality (i.e., learning experience = 100%), followed by no support in the work environment that allows or encourages the use and further development of what was learned (Support in work environment = 0%) will lead to – according to the aforementioned equation- : 100\% \times 0\% = 0\% result.

This example shows that training and learning specialists are usually focused on the learning experience side of the equation. This approach to training and learning is referred to as training for activity. However, as becomes clear from the example, what is actually needed is an approach that allows taking a broader perspective on training and learning. Taking not only care of the learning experience, but also taking into account the influence of the work environment of the training participants. This broader perspective is referred to as training for impact approach’. Table A.1 summarizes the main differences between both approaches during the different activities of training design and delivery (adapted from Robinson & Robinson, 1989).

Though its advantages are promising, one should realize that adopting the training for impact approach increases the scope and complexity of the design and delivery of training and learning. The training for impact approach provides many challenges and requires carefully planned efforts and considerable diligence (Fuller, 1999). Moreover, adopting this perspective does not exclude us from further examination of the learning and training design literature. It is noteworthy to mention that the training for impact approach is not a fully elaborated design strategy that provides detailed guidelines for all relevant issues. It can be considered as a more holistic perspective on training and learning. Therefore, more worked-out training design theories that touch upon all relevant issues need to be consulted to further outline an appropriate design strategy for a training in handover.
Table A.1. Main differences between training for activity and training for impact regarding activities during the design and delivery of training and other learning events.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Training for Activity</th>
<th>Training for Impact Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partnership</strong></td>
<td>No attention for building alliances with stakeholders to assure the training is linked to actual organizational needs.</td>
<td>Strong alignment with those who have organizational authority for making key decisions and with managers and supervisors of the prospective participants of the training and other learning events. This assures that training and learning address the actual organizational needs.</td>
</tr>
<tr>
<td><strong>Performance analyses</strong></td>
<td>Analyses restricted to the training content and participant characteristics.</td>
<td>In-depth analyses of the needs to gain insights into the problems, their causes, and possible solutions. Involvement of all relevant stakeholders, including prospective training participants, in the analyses to assure high quality data and sound interpretations.</td>
</tr>
<tr>
<td><strong>Analyses of workplace factors</strong></td>
<td>The application in participants’ jobs is not perceived as an issue for training and learning specialists.</td>
<td>Workplaces are assessed on how these promote or interfere with the training. Initiatives to increase the transfer to the workplace in close collaboration with prospective participants, their supervisors and other relevant stakeholders.</td>
</tr>
<tr>
<td><strong>Measurement of results</strong></td>
<td>Measurements are restricted to measurement of participants’ satisfaction about the training, sometimes it also involves learning results.</td>
<td>Measurement is not limited to participants’ learning results at the closure of the training but also includes measurements of the transfer to the job and organizational results (e.g. reduction of faults or nearly-faults).</td>
</tr>
</tbody>
</table>

A.4 Training and other modes of learning

In this report the terms training and learning are used, because not all learning can be considered as training. Although it is broadly recognized that training can be an effective and efficient way of organizing learning, most learning occurs outside the context of training. Training in itself is usually insufficient to achieve the intended learning results, because feedback, resources and other features of the work environment are not geared to support the desired performance of the participant in the workplace. For learning to occur, training should therefore be accompanied by other (learning) interventions in the workplace to achieve the intended results and become effective. These learning interventions embedded in the workplace have a non-instructional nature, but nevertheless require attention and need to be designed, developed, and implemented with care.
Appendix B: Example of a cognitive map

Screenshot of the cognitive map on handover training design issues and solutions.
Appendix C. Interview scheme

Interview scheme for the interview with training specialists.

[Recording starts. To code the interview without mentioning the participant’s name, mention for which domain the participant provides training and the participant’s serial number in this domain (for example: interview secondary domain, participant 2)]

Interview primary care / secondary care academic / secondary care regional
Participant 1/2/3/4

[Introduction]
Thank you for your participation in this interview. This interview is part of a European project on improving handover practice. With handover I mean, when a patient is handed over from primary care or the patient’s home to the hospital and back from the hospital to primary care or the patient’s home. Unfortunately research results show us that good handover does not happen by chance and serious errors are made, resulting in adverse, sometimes life threatening, situations for the patient. In this project we investigate how we can improve the handover process. One way to improve handover practices is to train the health care providers that are involved in the handover process to, for instance, communicate better or to become more aware of the complexity of the handover process and to use electronic tools for handover more effectively.

At the moment we are investigating what could be the content of such a training, but also how this training should be designed, organized, implemented, evaluated etc.. For this, I would like to make an appeal to your expertise on training. If you do not have any experience with training related to the improvement of handover, that is not a problem, you can answer the questions, based on your experience with training in general. Is the objective of the interview clear to you? [Participant answers].

The interview will be recorded in order to prevent loss of data. The recordings will be used for research purposes only and will remain completely confidential and data will be analyzed completely anonymous. Do you give permission to record this interview? [Participant answers]. Thank you. Then I will now start with the interview.

First I would like to ask you some questions regarding your background.

1) Where are you currently working (name of the institution + country)? What is your profession and could your describe your tasks, especially those related to training?

2) How many years of experience do you have with training and what kind of experience do you have? For example, coordinating, implementing, organizing, conducting training...
3) How many years of experience do you have with training in handover? By training in handover I mean to train care providers to handover a patient from primary care or the patient’s home to the hospital and back from the hospital to primary care or the patient’s home.

4) What kind of experience do you have in training in handover? For example, coordinating, implementing, organizing, conducting training…

These were the questions on your background information. Next, I would like you to imagine that it is decided to provide a training on handover and a new colleague with little experience has to coordinate this process. He asks you for advice on several aspects of the training. I have listed some questions this colleague could ask and I would like to know what you would advise this colleague based on your experience with training / with training in handover. Is this clear? Let’s start with some questions on the content of the training

5) Regarding the content of the training, how do I decide what to train? How should I determine the content of the training on, for example, handover?

[Question 6 is ONLY asked if the participant has experience with training in handover – otherwise continue with question 7]

6) From your experience, what aspects of the handover process should be trained during a training on handover? For example, communication rules, team work, tool use….

Next I have some questions on the design of the training.

7) Regarding the group composition of the participants of the training, would you advise mono disciplinary groups or mixed, multidisciplinary groups? For example, training nurses and doctors separately, or training them together in the same group. Why?

8) What would you advise regarding the duration of the training? How many hours or days should the training take? For example, should it be a maximum of 2 hours, of is it better to spend at least 4 hours, or even a day or a couple of days…..

9) What would you advise regarding the training format? What works best for the medical staff. For example, should there be lectures, demonstrations, role play, simulations, training on the job…?

10) Regarding the meetings, what type of meetings should be organised? For example, face-to-face in small groups, face-to-face with lectures (large group), e-learning/self-study (no face-to-face meetings).

11) What would you advise regarding assignments? Should there be assignments before and/or during and/or after training? And what kind of assignments should be given?
12) What would you advise regarding follow-up sessions? Is it advisable to organize for example a follow-up session in which is discussed if the participants have used what they learned during training in their jobs. What are the advantages/disadvantages?

13) Would you advise to formally examine whether participants are able to correctly apply what was trained? What are the pros and the cons to formally examine participants?

14) Should participants receive a certificate?

*Let’s continue with the organisation of the training.*

15) What arguments should be used to stress the importance of the training?

16) How should the staff be motivated to participate in training?

17) Should participation in training be obligatory or should it be voluntary? Why?

*Next, I would like to ask some questions on the evaluation of the training*

18) What is the most appropriate way to evaluate the training? For example, should there be a formal evaluation, using a questionnaire or should it be a more informal evaluation by shortly discussing the training at the end of the training session..

19) What is a good way to measure the training effects on the actually handover process in daily work? For example to measure whether less adverse events have occurred, or whether more relevant information has been handed over.

*Finally I would like to ask you some questions regarding what happens after the training.*

20) What conditions should be met to enable the staff to put into practice what they learned during training?

21) Do you have any suggestions for how conditions could be improved in order to enable staff to apply what is learned. For example, purchase electronic devices for handover such as PDAs (Personal Digital Assistant), make the new handover protocol mandatory.

*These were all the questions I wanted to ask.*

22) Do you have any comments that could be meaningful regarding a training in handover. Or do you have any questions or anything else you want to share?

*Then I would like to thank you again for your participation. I will make a summary of this interview and will send it to you within three days. I would like to ask you to read this*
summary and provide me with any feedback. If I do not receive any feedback or comments from you within three days, I will assume that you agree on the summary I made. Is this all clear to you?

23) What e-mail address can I send the summary to?

Thank you again. [Recording ends]
Appendix D. Content of the training

Introduction

As a first focus of the needs analysis it is investigated what problem(s) need to and can be resolved by means of a training. It is investigated what kind of problems are experienced by all relevant stakeholders involved in the handover process (i.e., primary care doctors and nurses and hospital doctors and nurses), and what factors are responsible for these problems. If possible, these factors put forward by the different stakeholders are categorized. Next, the search for possible solutions to these problems can start. The identified solutions form the basis of the content of the training.

In the next sections the methods used for the problem and solution identification conducted by partners participating in workpackage 4 is explained, the identified problems and solutions are discussed and implications for a training in handover are formulated.

D.1 Method

In order to identify common causes of ineffective handovers (i.e., barriers) and directions for solutions to improve these ineffective handovers (i.e. facilitators) two information sources were used: a literature search and question 6 from the interview with training specialists (i.e., “From your experience, what aspects of the handover process should be trained during a training in handover? For example, communication rules, team work, tool use.”).

D.2 Identified factors causing problematic handovers

It is often thought that problematic handovers are caused by a mistake made by one person or a group of people. However, the majority of adverse events do not result from individual recklessness or the actions of a particular group. More commonly, errors are caused by faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them from making mistakes (Kohn, Corrigan, & Donaldson, 1999). The studies in our literature search acknowledge this, showing that the problems occurring during handovers are caused by several factors. Using cognitive mapping, it appears that these factors can roughly be divided into three categories which relate to (a) who is involved in the handover, (b) how the handover is performed, and (c) the organisational structure in which the handover is embedded. These categories provide us with useful directions to formulate solutions for the improvement of handover processes. In the next sections these categories will be discussed in more detail.

Factors related to those who hand over

Several factors related to the characteristics of the people involved (e.g., primary care doctors/nurses, secondary care doctors/nurses) in handovers can cause ineffective handovers. First, in the handover process different parties are involved, who all differ in their level of expertise, the amount of education or training received in hand off, the years of experience with handover, and their attitudes towards handover. These differences between caregivers involved in handovers can have a negative influence on the
effectiveness of the handover. For instance, research shows that less experienced providers may communicate different information than more experienced ones (Bruce & Suserud, 2005), who in turn often do not adapt their handover practices to their less experienced colleagues (Sutcliffe, Lewton, & Rosenthal, 2004).

Second, the attitude towards handover can cause problems. That is, the majority of those involved in handovers are not aware of the associated risk of inadequate reports during handover, until there is an adverse event. Moreover, people are often not aware of the quality of their handover. Most handovers become a routine and people do not need to reflect anymore on its quality. They may become blind for suboptimal results caused by routines in circumstances that need a more customized approach (Perrow, 1999).

Third, inter-personal relationships may affect the handover process as well. For instance, two caregivers who work frequently together may handover more efficiently and effectively than caregivers who rarely work together (Cohen & Hilligos, 2009). Moreover, attitudes among the different medical professions toward one another can interfere with communication during handovers across disciplinary boundaries (Apker, Mallak, & Gibson, 2007; Horwitz et al., 2008; Thakore, & Morrison, 2001). Caregivers from one profession may become prejudiced by previous negative experiences during handover with caregivers from another profession which influences their handover practices. For example, when during a handover a caregiver feels not attended to by the receiving caregiver, next time this caregiver may not bother communicating pertinent information under the assumption that it will not be taken seriously.

Fourth, social structures may influence handover communication. That is, formal authority structures influence how caregivers communicate with each other. It affects the willingness to exchange information, ask questions and seek for clarification (Kobayashi et al., 2006; Solet, Norvell, Rutan, Frankel, 2005). Fifth, erosion of professionalism negatively influences handover. Erosion of professionalism can be explained by so called agency problem (Arora et al, 2008), or “not my patient” phenomenon. It is the lack of responsibility to cross-cover patient, which becomes a real issue in conditions of health care discontinuity.

Finally, the patient who is handed off can also influence the effectiveness of the handover. That is, some patients require more and specific attention during handovers such as patients with co-morbidity. If the caregiver does not devote this extra attention to this patient - because the handover has become routine and the caregiver is not responsive to important novelties (Cohen & Bacdayan, 1994) – the handover may result in an adverse event. The same applies to the physical capability of the patient to take care of himself. This also influences the impact of handover problems on the patients’ daily life (Mistiaen, 2007).

Factors related to how the handover process is performed

The vast majority of hospital personnel received little or no training in handing off as part of their formal education (Bernau, Aldington, Robinson, & Beasley, 2006; Sinha, Shriki, Salness, & Blackburn, 2007). Not surprisingly, the way professionals hand off is mostly learned on the job (Patterson, 2008; Roughton & Severs 1996), resulting in a lack of guidelines for effective handover or critical examination of current handover practices. In line with this, review studies show that the majority of the handovers are not standardized procedures. Research indicates that there are not formal policies or guidelines as what
information should be included in handover forms (Cheah, Amott, Pollard & Watters, 2005). Handover are not standardized regarding the content of the handover and the process. Without standard procedures there is a lack of common language and lack of clarity about what information should always be communicated during handover and how the information should be communicated. This often results in inaccurate, insufficient and unrecorded medical documentation such as care plans, medications, patient conditions, code status, and test results (Sutcliffe, Lewton, & Rosenthal, 2004; Arora et al., 2005; Mukherjee, 2004; Wachter & Shojiangia, 2004). Furthermore, gaps and delays in communication between healthcare teams and poor discharge documentation cause adverse events for patients after discharge (Atwal 2002; Helleso 2006; McKenna et al 2000; Watts & Gardner, 2005).

Ineffective communication during handover is also rooted in an erroneous perception of how human communication works (Lardner, 1999). Many people, including caregivers, think that communication is a straightforward, simple process. They perceive communication as if it involved the use of a pipeline or conduit to transfer thoughts and feelings between individuals (Axler, 1984). The metaphor implies that speakers and writers insert thoughts or feelings into words, which are then extracted without any problems by listeners or readers. However, this pipeline metaphor is not in line with four basic facts about human communication (Lardner, 1999). First, communication does not involve the transfer of meanings from one person to another. Rather, the listener or reader creates meaning in his or her mind. Second, anything is a potential message, intended or not. Third, the message received is the only one that counts. The fourth basic fact is the need for some degree of repetition of communication to ensure comprehension. The sum of the first three facts is that unintentional meaning is likely and potential miscommunication is the norm. Seen from the perspective of the conduit metaphor, communication is relatively easy, unproblematic and the recipient is largely passive. This is a dangerous view to hold, particularly when great risk is attached to miscommunication (Lardner, 1999).

Finally, the media used during handover can influence the effectiveness of handovers. Handovers include either a verbal or recorded component or both. Examples of verbal components are face-to-face and telephone conversations. Recorded components are for example informal notes, audio recordings, formal sign-out documents and entries in patient medical records and computerized handover systems. Because each medium has its advantages and disadvantages it is not possible to identify a single ideal medium (Friesen, White, Byers, 2008; O’Connell & Penney, 2001). For example, using only verbal components, may lead to loss of information due to the limited capacity of the human memory. Using only a recorded component, however, can lead to erroneous interpretation of the information, because the receiver has no direct opportunity to clarify information by asking questions and receiving immediate answers. Furthermore, using written reports for the recorded component can cause loss of important information due to illegible handwriting. The use of written reports also limits the transmission of the information to postal services which can cause delay in handover. Finally, the loss of written reports can cause a serious delay in recovering patient’s information.
Factors related to system issues

According to the first report by the US Institute of Medicine committee, *To err is human, building safer health system* (Kohn, Corrigan, & Donaldson, 1999) the majority of adverse events do not result from individual recklessness or the actions of a particular group. More commonly, errors are caused by faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them. Handover is part of a larger system and when good people have to operate in bad systems, problems are inevitable. System issues can delay appointments, testing, or notification of results; or communication may fail along a potentially convoluted continuum of care (e.g., patient to primary care provider to diagnostic testing to and from specialists; Webster et al, 2008). The system can negatively influence handovers for instance when only little time is scheduled for handover or if there is no special distraction-free location for handovers causing many interruptions during the handover (Parke & Mishkin, 2005). Furthermore the lack of strong leadership and a culture of safety can undermine the effectiveness of handovers (Kohn, Corrigan, & Donaldson, 1999; Webster et al., 2008). In addition, a culture of blame instead of a culture of report makes professionals less prone to report mistakes, learn from mistakes and ask for help to improve their handover practices. This is also seen in the training of medical students. Formal training programs do not include mechanism for helping training participants to cope with the psychological impact of such errors on participants. The training participants are afraid to acknowledge the errors they have made (Shojania, Fletcher & Sanjay, 2006)

Finally, the recent regulation for reducing work hours also negatively influences the patient’s safety through increase in handovers. The direction of this impact on patient safety is not clear yet but there are some indications that reducing of work hours will increase the number of patients’ handovers, which in turn would lead to an increase in the amount of adverse events (Shojania, Fletcher & Sanjay, 2006). Reduction of work hours might lead to a decrease of human errors due to fatigue. However, at the same time it introduces a new safety problem because this also means more handovers per patient. The more the patient is handed off, the higher the chance of an adverse event.

D.3 Training content: solutions to handover problems

The factors described in the previous sections, causing problematic handovers, need to be taken into account when planning to improve handover practices. In literature, many solutions to the aforementioned problems are provided. Most of these solutions are related to standardisation of the handover content en process and the use of technology. Other solutions which are less frequently, though increasingly, mentioned pertain to the social organisation, the culture or climate within an organisation. And finally there are solutions that pertain to the organisational structure, leadership and policy issues.

For the purpose of this deliverable, the literature was especially searched for solutions that also described the role of training in improving handovers. Unfortunately, the majority of the literature focuses mainly on describing the solutions (i.e., the content of the training), and only mentions that a training was provided to the caregivers. The elaborations on educational aspects are rather limited and fragmented (Arora, Johnson, Meltzer & Humphrey, 2008; Johnson & Barach, 2009; Iedema et al, 2009; Shojania,
Fletcher & Sanjay, 2006). The straightforward conclusion of the dedicated literature is that there is not a systematic approach to teach best practices in handover.

This section will therefore provide an overview of solutions to problematic handover that should be part of the content of a training in handover. This also means that the solutions described in this deliverable are limited to those that can be accomplished by means of a training. Solutions pertaining to system issues or policy are not described here. However, a more detailed analysis of the factors that inhibit and facilitate effective handovers and solutions will be provided by the partners in workpackage 2 in the third deliverable of the HANDOVER project. Also solutions with respect to tool use or technologies will not be provided in this deliverable. The partners in workpackage 3 will investigate the use of tools and communication models and will report on this in deliverable 5. Furthermore, in this section it is not described how these solutions should be trained. More specific information on training design, delivery of the training or systematic approaches to teach handover are described in Appendix F. In the following sections the factors that cause problematic handovers are described and several solutions to tackling these factors, which could be part of the training content of a training in handover, are discussed.

**Standardisation of the content of a handover**

When handing off a patient it is important that the receiving caregiver is provided with the most important information to be able to continue care for this patient. Standardized report forms encourage filling of relevant fields, which increases transfer of critical data. The critical elements that have to be included on these report forms will vary by unit and type of patient. However, it is important that all professional groups involved in the handover process agree on the fields that should be included in the report form.

An important guideline that should be taken into account during the development of a standardized report form is that handover communication works best if it captures problems, hypotheses, and intent, rather than simply lists what occurred. The same applies to listing of work completed rather than giving a predictive diagnosis of the situation (Grusenmeyer, 1995). Research indicates that perception and memory are organized by hierarchical goal representations and that these representations in turn drive narrative comprehension, memory and planning (Zacks & Tversky, 2001; Zacks, Tversky, & Iyer, 2001). It might therefore also be advisable to make recently updated information salient to the receiver, for instance by providing the opportunity to mention the most recent and the most important changes in the patient health status. Flagging critical information is also recommended (Patterson et al., 1995).

A promising approach for building a standardized handover report form which could be taught during handover training is process mapping (Barach & Johnson, 2006). Process mapping, describes what an individual is required to do, in terms of cognitive processes, actions or both to achieve the system’s goal (i.e., effectively handover patient). Process mapping can be accomplished through observations and/or interviews that carefully break down the multiple steps in the process (Barach & Johnson, 2006). During training, process mapping can be used to train participants in becoming more conscious of what kind of information should always be handed over. Participants can be guided in developing a standardized handover report form that best fits their handover situation.
When learning to develop a customized handover protocol during training, participants can either start from scratch or they can start from or even use existing handover communication models. Participant should be trained to analyse existing communication models in order to be able to decide what model or aspects of a model are most relevant for their handover situation. Two communication model that have been receiving growing attention are I-SBAR and 5Ps. I-SBAR (Introduction, Situation, Background, Assessment and Recommendation) was introduced to help clinicians to have a shared mental model for the patient’s clinical condition (Arora & Johnson, 2006). The five P’s stand for: Patient, Purpose, Professionals, Processes and Patterns. The 5Ps are a reminder of the essential elements of well functioning care systems (microsystems) and the interrelatedness of those elements in meeting the needs of the patient. The project partners of workpackage 3 will further investigate what communication model is most effective for handovers in the context of HANDOVER and should be part of the content of the training in handover.

Standardisation of the process during handover

Regarding the standardisation of the process it is important to first take away the naive and erroneous theories participant hold on how effective communication works. Especially the perception of communication as an easy, unproblematic linear process should be replaced by the idea that human communication is complex, requires practice and devoted attention (Lardner, 1999) and involves an circular pattern of communication (Parke & Mishkin, 2005).

Furthermore, participants should be familiarized with the concept of mental models. A mental model is the internal mental representation held by an individual. In the context of handover this is for example a representation of the patient’s health status and actions to be taken (Lardner, 1999). When two persons who have to communicate with each other have compatible mental models (i.e., they have the same or almost the same representation of the patient’s health status), the communication is not problematic. However, when their mental models are not compatible when they start to communicate (i.e., they have both a different representation of the patient’s health status) - which is the case during a handover - the role of communication becomes crucial. Through communication the differing mental models need to be aligned. As shown in Figure D.1, the communicators need to come to a shared understanding: both entail the context, experience and mental model of person A, through the communication channel (from sender to receiver) and affirmation channel (from receiver back to sender). Otherwise the receiver will base his next interventions on incorrect or incomplete information of the patient’s health status, which can have serious negative effects on the patient’s health.

![Figure D.1. Schematic representation of the communication process.](image)
After the participants have a more realistic view of how communication works, they can be provided with information on principles of effective communication that should be present in a standardised handover process. During training participants can be guided in using these principles to develop a standardised handover protocol that fits the handover situations they are involved in. The following principles for effective communication should be explained and trained:

**Two-way communication, preferable face-to-face**
This is one of the most advised best practices for effective handover. That is, errors in handover are caused by differences in the mental models between caregiver A and caregiver B. By establishing a two-way communication, the receiving caregiver is able to ask questions and clarifications or rephrase the information that is handed off by the other caregiver (see Figure 3.1. affirmation channel). In this way differences in mental models can be exposed and repaired (Grusenmeyer, 1992, Lardner, 1992). Moreover, face-to-face handovers enable gestures, eye contact, tones of voice, degrees of confidence, and other redundant and rich aspects of personal communication to be utilized in conveying possible different mental models (Hopkin, 1980; Knapp & Hall, 2007).

**Feedback: repeat-back / read back / review**
This principle shows that effective communication does not follow a linear but rather a circular pattern (Grusenmeyer, 1992). Person A communicates a message to person B, which in turn communicates back to person A. This is called feedback and enables a) the receiver to confirm he has received, correctly interpreted and understood the message, and b) the sender to confirm that the communication has been successfully transmitted and clarify any misunderstandings. Especially when the mental models of the provider and receiver are not compatible, providing feedback and using two-way communication becomes extremely important. The more feedback is provided, the greater accuracy of and confidence in communication. This feedback can be established by standardising a repeat-back, read back or review opportunity for the receiving caregiver (Shojania et al., 2006). This means that after the information is provided by the caregiver, the receiving caregiver will always have the opportunity to either repeat back the information he just received (e.g., “If I understand correctly, patient x is...”), or will read-back the information he has just written down, based on what the other caregiver told him (e.g., “So I have written down here that patient y...”) or the receiver is given the opportunity to review the information the other caregiver provides him with (e.g., name, date, figures copied from electronic measurement instruments).

**Written and verbal communication**
To ensure understanding, some degree of repetition is needed in communication. Two types of repetition can be distinguished: intra-message and extra-message. The former refers to repetition within the message, the latter to repetition over more than one channel, e.g. verbal and written. In this case of repetition, most effort is required from the caregiver who hands the patient off.
In addition to training participants to develop a handover communication model based on principles of effective communication, participants should also learn to take into account guidelines pertaining to effective implementation of communication models or clinical guidelines, because their implementation appears to be a serious issue (Francke, Smit, Veer & Mistiaen, 2008). The following guidelines should be explained and trained to ensure that the developed communication model will also be used in practice (adapted from Francke, Smit, Veer & Mistiaen, 2008):

- The model needs to be as much as possible evidence-based.
- The model should be developed with the participation of its end-user.
- The model should be easy to understand and its use should be straightforward.
- The model should be agreed upon by all those who will have to use it.
- More experienced professionals will be more inclined to use the model and should therefore help to convince less experienced professionals of its usefulness and importance.

To sum, efforts to improve information exchange and communication and to reduce associated errors include standardizing handover practices. When standardizing the handover, both the content and the process should be taken into account. Moreover, there is a great variety regarding the purposes and circumstances of handovers, which makes it complicated to formulate one standardized approach. In line with the recommendations of the Joint Commission (2008) it is advisable to standardize the process as much as possible throughout the organisation, with adjustments to fit the needs for particular patient groups or circumstances. In addition, the implementation of standard procedures or clinical guidelines is more effective when the standards are developed by its end-users. This means that the training should not only focus on training participants to use the standards, but also how to create their own standards in close cooperation with all those involved in the handover. In the previous sections it was therefore not described what communication model should best be trained during a training in handover. Rather, it is explained how participants can be informed during training to be able to develop their own handover communication model. They are trained to develop a handover communication model that best fits their handover situation, based on both principles of effective communication, existing communication models and guidelines for effective implementation of communication models. By involving professionals in the development of the communication model which will be used in their daily work after the training, they will (a) better understand the rationale behind the communication model which will contribute to more mindful handover practices, (b) be more inclined to use the model, and (c) be better able to continuously reflect on the handover practice and be more inclined to adjust the communication model if needed.

**Attitude towards and during handover**

In addition to training participants’ skills and knowledge to improve handover, it is important to assure that they understand the importance of effective handover and critical reflection on their current handover practice. The participants need to develop a feeling of responsibility and understand that when a patient is handed over to them, the
responsibility of this patient is also handed over to them. This change in attitude is probably one of the most important issues that should be addressed during the training, but is at the same time also a very difficult issue to address.

D.4 Preliminary results from the interviews

From the 18 training specialists that were interviewed, only 3 had some experience in providing training in handover. The answers to the question what should be trained during a training in handover, were therefore mainly based on the training specialists’ experiences of previous training, on own experiences with handover during previous profession, and on theoretical knowledge of handover. The majority of the interviewees point out that the attitude towards handover is a very important issue that needs to be part of the training. Participants need to become aware of the importance of effective handover and the consequence of problematic handover: “To make participants feel that the issue of handover is important and meaningful.”; “Training content should include case studies on adverse events.” Furthermore, the advices of the training specialist pertain to making participants more aware of the complexity of communication: “They need to learn how to communicate in a structured manner, to assure that the other knows what you know before you handover the responsibility of the patient” (NL). And to learn how to communicate more effectively: “Training content should include protocols (SP)”, “The content should include where to refer a patient…precise and detailed history… and good patient characteristics (PL), and “They also need to learn to pay attention to non-verbal communication (NL).”. Regarding the use of standards and technology, the training specialists agree that this should certainly be part of the training. However, they could not mention any specific communication models or technologies that should be part of the training. In addition, some interviewees expressed a concern that a standardized handover protocol while very useful, likely would not be appropriate for all medical specialties and countries. There is a need for tailor made processes for handover that best fits each handover situation. These preliminary interview results are in line with the guidelines derived from the problem identification and the proposed solutions mentioned in the previous sections.

D.5 Conclusions and practical implications

It can be concluded from the problem identification that several factors influence handovers. These factors can be divided into factors that can be resolved by means of training (i.e., individual and procedural factors) and factors that need an approach that goes beyond training (i.e., organisational factors). Because this deliverable focuses on training of handover, the latter type of factors are not further considered.

With this analysis of problems and especially solutions, the practical implications for training in handover become apparent. To tackle the individual and procedural factors that negatively influence the effectiveness of the handover process participants should be trained to (a) standardise the content of handover, (b) standardise the handover process, and (c) become aware of their responsibility during handover. Regarding the standardisation it is especially important that the standard is developed by the participants themselves in close cooperation with all those involved in the handover. That is, one should strive for co-creation of handover standards. The standard could either be developed from scratch, or could be based on existing standards (e.g., SBAR, 5Ps).
Furthermore it is important that the focus of the training is not only on skills (i.e., learning to use a standard), but also on knowledge (e.g., knowledge of mental models, rules for effective communication), and on attitudes (e.g., attitude towards responsibility during handover). It is important that skills, knowledge and attitude development and/or change are all part of the training. How these different components of competence development should be taught in an integrated manner is explained in Appendix E. More detailed information on the content of the training will be provided by partners of workpackage 3. The analyses performed by the partners in this workpackage will result in more insight in what specific communication model (i.e., clinical guideline) should be trained during training.

Regarding the appropriation guidelines for training content per country or patient group, it is only possible to provide practical implication after more information is available from the analyses which are currently conducted by the partners in workpackage 2. After analyzing differences in factors that affects effective handover between different European countries and between different patient groups, more detailed implications for the content of the training can be provided. For now, the only practical implication regarding differences between countries and patient groups, is that it is recommendable to not develop a one-fits-all training, with one specific training content but to construct a generic training which can be customized by training specialist by means of building blocks and a toolkit to fit the needs of the handover situation of the training participants.
Appendix E. Training Design approaches

Introduction

In this appendix it is described how training for handover should be designed. In order to identify a suitable training design for training in handover, first, the issues mentioned in previous research on training in handover are identified. Second, solutions to resolve these issues are proposed.

E.1 Method

The data to gain more insight in the design for a training in handover was mainly collected through a literature search. The priority was given to publications on the pedagogical aspects of handover, but studies on handover in general were not excluded from the review. In addition, a search about pedagogical approaches in medical domain at large was performed. Apart from single studies, some meta-reviews were referred to as well. Although, considered as an unusual approach, we did rely on serendipity search too. For example, while we were doing search for other projects, we came across a number of publications on some training approaches in the medical domain (i.e., performance support systems), which could be highly relevant for the handover training as well. A second source for data collection were the interviews conducted with training specialists. Questions 6 to 18 (see Appendix C) were analyzed for this purpose.

E.2 Issues related to training in handover

Although the number of studies investigating the success and failure factors for handover is increasing, research on its educational aspects is rather limited and fragmented (Arora, Johnson, Meltzer & Humphrey, 2008; Johnson & Barach, 2009; Iedema et al, 2009; Shojania, Fletcher & Sanjay, 2006). The straightforward conclusion of the dedicated literature is that there is not a systematic approach to teach best practices in handover. However, based on the few studies that investigated the educational aspect of handover, several issues could be identified that should be taken into account when designing a training in the handover. In total, eight issues were identified in a cognitive map (see Appendix A; formulated in a slightly different way to conform to the cognitive mapping coding rules) and all of these concepts score high on domain analysis, which is an indication that they really represent key issues on handover training design. Each of these issues will be described.

First, a tool or technique can be well developed and taught, but if it is not used in practice after training, it is pointless to even train the use of this tool or technique. Research by Francke, Smit, Veer & Mistiaen (2008) shows that clinical guidelines are an example of such a technique: although the practice of developing clinical guidelines is getting more intensive and extensive, the implementation of these guidelines is a serious issue. A comprehensive meta-review conducted by these authors, including twelve other systematic reviews, identified factors that affect the implementation of clinical guidelines for health care professionals. It appeared that the characteristics of (a) the guidelines, (b) the implementation strategies, (c) the professionals, (d) the patients, and (e) the environment affect the implementation of the guidelines after the training. More detailed information on the influence of these factors is provided in Appendix F.
Second, one should realize that a training in handover in which the use of a tool or technique is trained, mainly focuses on improving the use of this tool or technique, and not on improving the tool or technique. For example, computerized handovers that extract information from existing clinical electronic information systems are a promising approach to improve handover practices. The effectiveness of electronic handover systems, however, depends on the formal policy and guidelines about what information should be included in handover and the communication format implemented in the system (Cheah et al., 2005; Shojania et al., 2006).

Third, training design approaches, including those in the medical domain, are mainly oriented towards supporting individual cognitive processes involved in a learning event instead of distributed or collective cognitive processes (i.e., training the individual vs training the team). Individual cognition is considered a localized phenomenon, which resides solely in one’s head and can best be explained in terms of information processing and internal representations. This is what Perkins (1986) refers to as person solo. Individual cognition is useful for analyzing cognitive structure, processes and products of individuals. However, in typical handover situations interactions take place which can not be accounted for from an individual cognition perspective (i.e., interaction is not taken into account). For these situations one needs to hold a perspective of person plus (Perkins, 1986) or distributed cognition. Unfortunately, in the medical management practice the view of personal approach to human errors in the individual cognition-based training approaches is still prevailing (Reason, 2000). Human errors are attributed to mental processes such as attention, perception, memory and motivation, residing in an individual. Thus, the classical training design approaches are insufficiently flexible to account for system factors, which must be also taken into account.

The fourth issue of handover training is related to supervision in teaching hospitals (Shojania, Fletcher & Sanjay). It appears to be problematic to find a balance between supervision, service, and autonomy of training participants. That is, increase in service workload leads to decrease in time that can be devoted to teaching. Many attending physicians either prefer to perform most of the procedures themselves or leave it to the ones positioned lower in the hierarchy (i.e., residents, interns, and nurses) instead of gradually introducing students to clinical procedure and techniques. A study by Stalmeijer and colleagues (2008) shows that clinical supervisors lack time and teaching expertise which results in the fragmented use of modelling, coaching and articulation as methods for supervision. The scaffolding, reflection and exploration methods for supervision were even less frequently used. While the tension between service and supervision is a well recognized threat for medical education, the problems related to the transfer of supervision skills from supervisor to student is a neglected issue. That is, being a good professional does not necessarily mean that one is also a good supervisor. Supervising and teaching is not only a matter of transferring the content (e.g., valuable clinical knowledge and skills), but is also about using an appropriate and effective method of supervision. If the supervisor does not supervise in an effective manner, the student does not only experience problems with acquiring knowledge and skills, but also has no good modelling example regarding supervision. This starts a downward spiral regarding effective supervision, because the students will also not be able to balance supervision, service and education in his or her future supervision activities.
The fifth issue that is relevant for the design of a training in handover is related to the clinical culture. In this culture there is a reluctance of medical students to ask for help. One reason for this is the workload of attending physicians and residents, which creates a sense that the assistance can not be provided. Another reason is the tradition of labelling of students as weak or strong. Strong students are those who can handle heavy workload with little supervision. This labelling can make training participants more reluctant to ask for help because they do not want to be labelled as ‘weak’, even when they recognize the need to ask for help (Shojania, Fletcher & Sanjay). Another reason why students refrain from help seeking is that they do not recognize that they need assistance. If, in addition, the supervisor does not recognize this reluctance to help seeking when needed, this can result in problems in skill and knowledge development and can even lead to adverse events.

A sixth issue that can contribute to ineffective handover training is another cultural factor: the so-called culture of blame. This means that training participants are afraid to acknowledge the errors they have made. Shojania, Fletcher and Sanjay (2006), compared the results of two studies conducted in 1991 and 2005 respectively regarding the reporting of errors by training participants. They found little increase in the percentage of the training participants who disclose their errors to their supervisors: from 54% to 63%. In both studies negative feelings correlated with the training participants’ perceptions of training environment. Apparently, many formal training programs do not include mechanism for helping training participants to cope with the psychological impact of such errors.

A seventh issue is that it becomes clear from the literature that formal training in handover can result in good knowledge and skills development, but that its impact on job performance is rather limited (see also Appendix F). Traditionally, training is considered as (a) experienced outside the work context, (b) focused on knowledge rather than own performance, (c) making application of skills problematic, (d) being short in integrating different approaches from different domains to address real problems, (e) inflexible to incorporate the last developments of theory and practice, and (f) ineffective in transfer of knowledge and skills learned in training to workplace conditions. When designing a training these factors should be seriously considered. Appendix F provides guidelines on how the transfer of training can be taken into account during the design of a training.

Finally, the eight issue is that training is a necessary but not a sufficient condition to contribute to addressing the problems with handover identified in Appendix D. It is unrealistic to expect that training can solve all problems. For instance, redesign of clinical micro system includes training as a very important factor, but it goes beyond the scope of training paying attention to other factors such as national regulations, institutional policy, organizational culture, and management style, to mention but a few.

The analysis of handover training issues has revealed eight factors that can hamper training and should be taken into account during training design. The issues that were identified led our thinking to define training approaches to handover that reflect three levels of analysis design and development. These are formal training in handover, support of handover practices on workplaces and design of clinical micro system. The next section, which provides some solutions to handover training, focuses merely on the first
two levels: formal training and support in work environment, but also suggests some ideas for improving the clinical micro systems.

E.3 Domain dependent approaches for formal training in handover
This section introduces some training approaches, which have been specifically developed and used to improve handover. Some of these training approaches have been borrowed from training designs of other high-risk domains in which handover plays an important role (e.g., oil plant, aviation). It is assumed that as long as these approaches have been successful in improving communication and commitment in (handovers in) other high-risk domains, they are expected to be effective for improving medical handover practices as well. Other training approaches can be borrowed from teaching other subjects in the medical domain. It is assumed that if these methods have been successful in teaching other medical subjects, they should also be successful in training handover. In the next sections several domain dependent (i.e., the medical domain) approaches that could be used for formal training in handover are described in more detail.

Training communication models
To deal with communication issues in handover as described in Appendix C, the training design can include standard approaches to handover communication that are already used in other high-risk domains. Some examples are Crew Recourse Management, I-SBAR, Five Ps, I-PASS-THE-BATTON - which aim at improving communication through structuring of the content of the handover - , or face-to-face reports, and interactive questioning – which focus more on the process of handovers. In addition, Shojaiania and colleagues (2006) suggest that even very simple techniques such as summarizing key points and “repeat back” may be sufficiently effective to serve the purpose.

Training cross-cover patient commitment
Formal medical education needs to redefine medical professionalism as shifting the attention from one-doctor-one patient relationships to cross-cover patient commitments and transfer of professional responsibility. To this end, medical education adopts methods of high-performance teams where team members are expected to not only share a common vision and efficiently distribute tasks between themselves, but also to compensate for one another by means of back-up behaviour (Arora et al., 2008). It is also a responsibility of the team leaders to create appropriate attitudes, climate and role models to foster this shift in professionalism.

Principles for teaching handover
Johnson and Barach (2009) identified several instructional principle for teaching handover: (a) teach providers of information to tell a ‘better story’, (b) provide feedback, (c) couple inexperienced providers with experienced providers, and (d) consider the use of videotaped simulated handovers and self-directed videotaping for reflexive learning.

Iedema et al. (2009) introduce a specific tool called Handover-Enabling Learning in Communication for Safety (HELiCS). This tool uses a video-reflexive technique in which professionals participating in a handover situation are videotaped and the tape is played back for a reflection, analysis and discussion. This helps participants to gain insight into
previously unrecognized problems. It improves coordination, enhances the quality of care, strengthens junior-senior communication, and transforms tenuous doctor-nurse relationships into structured information-sharing process (Iedema et al., 2009).

Application of clinical guidelines

Clinical guidelines are evidence-based statements that help practitioners in their decision-making to increase quality of patient care. As mentioned before, many clinical guidelines across different medical fields have been developed, but only a small number have actually been implemented. In Appendix C some guidelines have already been mentioned to increase the chance of implementing clinical guidelines for handover in practice (see page 19). In addition, formal training could also contribute to improving some of the environmental characteristics affecting the implementation of clinical guidelines. It could contribute to providing more support from supervisors and peers, to include sufficient staff, to allocate sufficient time and to reduce work pressure. However, the impact of formal training in improving environmental characteristics is relatively limited compared to the impact of the support integrated in work environment and the redesign of clinical systems. The clinical guidelines can serve either as an independent instructional support for handover, or as part of a more elaborated instructional design model. Some of these instructional design models are described in the next section.

E.4 Domain-independent approaches for formal training in handover

There are several domain-independent or general purpose instructional design models that could be useful for designing handover training. These approaches are evidence-based and have proven to be effective across different domains. As they have been successful in other professional domains, they should be useful for medical education as well. The following domain-independent approach for formal training in handover will be described in more detail in the next sections:

- Problem-Based Learning
- Four-Components Instructional Design Model (4C/ID)
- Theory of Deliberate Practice
- Cognitive Apprenticeship
- Cognitive Flexibility Theory

Problem-Based Learning

Problem-based learning (Lajoie, Wiseman & Faremo, 2008) is probably the most popular approach in medical education. In a typical problem-based learning situation, learners are confronted with a real-life case while participating in a small group. Collaboratively the learners define the problem, formulate hypotheses, collect information, analyze data and evaluate their solutions. Research has not provided yet convincing evidence that problem-based learning is significantly better than other methods for medical education (Chang et al., 1995; Nadi et al., 2000; Koh et, al., 2008; Schmidt et al., 2006; Thammasitboon et al., 2007). Most of the studies go no further than to suggest a combination between problem-based learning and other forms of medical education, but no attempt is made to describe this combination as a design blueprint and test its effectiveness. In the following section we will focus on the other instructional design approaches, which are less known in
medical education. For these approaches the core elements are indicated which are most relevant for the design of a training in handover.

4C/ID-model

A promising instructional approach that has shown to be successful for the training of complex skills is the four-component instructional design model (4C/ID-model) developed by Van Merriënboer (1997) and modified by van Merriënboer & Kirschner (2007). This instructional design approach has been applied and examined in various domains, such as nursing, aviation and physiotherapy. It therefore has a high level of feasibility and it can be applied to various kinds of training delivery modes (including e-learning and training in simulated, virtual, environments). An in-depth description of this method is beyond the scope of this chapter. The basic claim of the 4C/ID-model is that all environments for complex learning can be described in terms of four interrelated components: (1) learning tasks, which are authentic whole tasks, based on real-life tasks from professional or daily life that typically require the integrated use of knowledge, skills, and attitudes (2) supportive information which helps learners to perform the problem-solving and reasoning aspects of these tasks, (3) procedural information, which points out to learners how to perform the routine aspects of learning tasks; it provides ‘how-to’ information just in time, precisely when learners need it, and (4) part-task practice which is additional practice to develop routine aspects of the tasks to a very high level of automaticity.

The learning tasks form the backbone of the training program to which the other three components are connected. The following principles are applied in the implementation of the program: (a) the task is always practiced in a holistic manner. Part task practice is only used for routine aspects of the task; (b) tasks are arranged from simple-to-complex and the complexity of the task is gradually increased according to the training participants’ level of skills and knowledge; (c) the level of support during performance is gradually decreased (i.e., from full support via medium support to no support at all), and (d) information necessary for performing the task is divided into information that should be provided prior to the task or just-in-time (i.e., during task performance). Taking these principles into account during the designing phase, training in handover will have a positive impact on transfer of training to the workplace (see Appendix F).

Cognitive apprenticeship approach

The cognitive apprenticeship approach (Brown, Collins, & Duguid, 1996; Brown, & Duguid (2000) modifies the idea of traditional apprenticeship - one of the most effective informal educational approaches through history - to adapt it to the conditions of formal educational system and curriculum. In general, cognitive apprenticeship approach involves an expert who demonstrates his/her expertise to learners while performing a complex task. In doing so, experts externalize, articulate and reflect on their cognitive strategies. Students, observe, enact and practice complex skills while being observed and supported by experts. The cognitive apprenticeship framework consists of three main categories: (a) content, (b) method and sequence of activities, and (c) sociology. Content is about the strategic knowledge of experts, which consists of the following elements: (a) domain knowledge (i.e., facts, concepts, and procedures), (b) heuristic strategies (i.e.,
general guidelines to accomplish tasks, which have been proven effective in many occasions), (c) control or metacognitive strategies (i.e., to control and monitor thinking strategies), and (d) learning strategies (i.e., learn-how-to-learn techniques).

Method includes the following six teaching methods: modelling, coaching, scaffolding, articulation, reflection, and exploration. A description of each of these methods is provided in table 4.1. Stalmeijer, Dolmans, Wolfhagen, and Scherpbier (2008) identified all these six methods in the practice of the supervisors in teaching hospitals, although the supervisors in this study were not purposely trained in cognitive apprenticeship approach. The authors concluded that modelling, coaching and articulation were more often used than scaffolding, reflection and exploration. Regarding the sequencing of learning activities, three principles underlie the sequence of learning activities: (a) global skills before local skills, (b) increasing complexity, and (c) increasing diversity. Students need to build a conceptual model of the knowledge, skills and thinking strategies. This conceptual model guides their performance and helps in monitoring their progress. Learning tasks should be ordered from simple to complex. Another mechanism for helping managing complexity is through scaffolding. Increasing diversity requires constructing a set of tasks that includes variety of knowledge, skills and strategies. This improves the transfer of knowledge and skills in various conditions, which contribute to flexibility of professional behaviour.

<table>
<thead>
<tr>
<th>Teaching method</th>
<th>Description</th>
<th>Role of the teacher</th>
</tr>
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<tbody>
<tr>
<td>Modelling</td>
<td>An expert performs a task in such a way that the student can observe and construct a mental model of the processes that have to be accomplished.</td>
<td>The teacher has to externalize his or her cognitive and metacognitive strategies.</td>
</tr>
<tr>
<td>Coaching</td>
<td>Supporting students while observing how they perform the task to bring the performance of the student closer to the performance of the expert</td>
<td>The teacher has to attract their attention, ask questions, ask for clarification, generalizations and predictions, and provide feedback.</td>
</tr>
<tr>
<td>Scaffolding</td>
<td>The initial support provided to the students by the teacher is gradually diminished</td>
<td>At the beginning the teacher does most of the tasks but then, step-by-step, the teacher gives the student more autonomy and responsibility.</td>
</tr>
<tr>
<td>Articulation</td>
<td>Any approach for externalizing knowledge and thinking strategies of students to both teachers and peers.</td>
<td>The teacher asks the student to externalize his/her knowledge and thinking strategies.</td>
</tr>
<tr>
<td>Reflection</td>
<td>Evaluation of performance by means of comparing own performance with either an expert’s performance or peers’ performance.</td>
<td>Focusing students’ attention not only on the product of performance but also on the process of producing it.</td>
</tr>
<tr>
<td>Exploration</td>
<td>Students are forced to be involved in problem solving activities to investigate a particular issue.</td>
<td>Teaching exploration strategies as part of learning strategies.</td>
</tr>
</tbody>
</table>
Finally, the dimension of sociology includes issues related to situated learning, community of practice, intrinsic motivation and cooperation. Learning should be organized in an authentic environment or in a learning environment that resembles as much as possible the professional situations in which learners are expected to apply their knowledge and problem solving skills. Situated learning would increase intrinsic motivation of learners because they clearly see the purpose of what they are doing. Cooperation between learners increases the opportunities for providing additional learning sources (including peers as a resource) and confronting groups with challenging circumstances. An essential property of community of practice is the model of learning as legitimate peripheral participation (Lave & Wenger, 2003). The participants start on the ‘periphery’, but they gradually develop a particular competence as they move to the core of the community.

**Cognitive flexibility theory**

Cognitive flexibility theory (Spiro & Jehng, 1990) is an instructional design approach that supports flexibility and transfer of problem solving skills in ill-structured situations. The approach presents problem solving information from many perspectives (i.e., various cases and examples are used). In medicine, cognitive flexibility theory has been implemented in a software application that proposes many clinical cases, which students should diagnose and suggest treatments, using different types of information (including both laboratory data and expert advices).

**Theory of deliberate practice**

The theory of deliberate practice (Ericsson, 2007) has consistently proved in numerous empirical studies that high professional mastery is a result of a specific training design, rather than coming naturally with experience or being an outcome of classical training. Deliberate practice means that expert performers and their supervisors identify specific goals for gradually improving some aspects of performance through systematic exercises and feedback. The performers develop self-regulated learning skills, including self-monitoring and self-control, in order to be able to achieve high independence when performing in representative situations.

**Integrating the domain-independent design approaches**

All of the domain-independent design approaches for training in handover emphasize the use of real-life or simulated examples and cases. This is a component which training specialist also consider as very important for the effectiveness of the training in handover. Most of the domain-independent approaches apply also modelling and scaffolding of expertise.

Regarding the design of training in handover, the domain-independent approaches can be used in two ways. One is to find the most useful role and place for each of them in one of the three training design modes: formal training, support in work environment and designing clinical micro system. Some of the instructional design approaches such as 4C/ID, the theory of deliberate practice and cognitive flexibility theory would be more appropriate for designing formal training in handover. The cognitive apprenticeship approach would fit better the conditions of handover support incorporated in work
environment. Its theoretical extension, communities of practice, would serve better the purpose of designing clinical micro system.

The second way of using domain-independent training approaches is to design a formal training in handover combining components of different domain independent approaches. It is a challenging task but it would be a more substantial contribution of the project to the field. A relatively simple attempt to achieve a similar goal already exists. Lajoie, Wisenmann and Faremo (2001) proposed a combination between problem-based learning (PBL) and cognitive apprenticeship approach in teaching clinical problem solving skills. The authors call the model hybrid PBL approach. While it is centred on collaborative problem solving in authentic situation, it is more directed or instructor-controlled including some of the components of cognitive-apprenticeship such as modelling, scaffolding and metacognitive strategies.

In line with this, is the challenge to combine training design approaches that focus on individual cognition and distributed cognition. Most of the aforementioned training design approaches all focus on supporting individual cognition. However, a complex handover situation involved not only individuals but also teams, tasks tools and workplace. Such situations calls for changing the unit of analysis and shifting the attention to distributed cognition as a methodological framework. A number of authors have contributed to the idea of distributed (shared) cognition, originally introduced by Ed Hutchins in 1995 (Brown, & Duguid, 2000; Greenberg & Dickelman, 2002; Nardi, 1996; Norman, 2007; Salomon, 1993). Distributed cognition paradigm considers condition as situated, context-dependent and potentially distributed in nature. Distributed cognition is interested in the interactions between human actors and technological tools in a particular context for accomplishing a given activity.

The emphasis on distributed cognition does not mean that individual cognition should be excluded from the analysis. Distributed cognition uses an ontological basis similar to individual cognition as it describes cognitive processes in terms of manifestations and transformations of both internal and external representations. The distributed cognition paradigm still tries to understand information processing but it does it across units of analysis broader than individual. Salomon (2001, p. 120) presents four reasons supporting the position why distributed and individual cognition always must be studied in interaction: (a) there are many cases that do not impose any distribution of cognition; (b) it is possible that some cognitions may not be distributable; (c) mental representations affect influence on daily actions; and (d) it is not possible to account for developments in distributed cognition systems without a reference to changes in individual cognition.

The handover training design, apart from combining components of different instructional design approaches, should clearly indicate how individual and distributed cognition will be supported. The operationalisation of distributed cognition in terms of training design components seems to be one of the most challenging issue for designing handover training. One of the applications of distributed cognition is in medical team training in health care. Medical team training, either simulation-based or classroom-based is considered as one of the most effective solutions to the patient safety crisis (Baker et al., 2009).

The cognitive map reveals the very special role of cognitive apprenticeship approach in the discussion about handover training design. The approach can be used for
either designing formal training, providing support at the workplace or redesigning clinical micro system. The cognitive apprenticeship approach supports both individual and distributed cognition. The handover training design, apart from combining components of different instructional design approaches, should clearly indicate how individual and distributed cognition will be supported. The operationalisation of distributed cognition in terms of training design components seems to be the most challenging issue for designing handover training.

E.5 Incorporated support in the work environment

One issue of formal training consistently reported in the literature is transferability of training outcomes to workplaces. It is important that effective handover activities are supported in work environments as well for instance by means of handover job aids. A job aid is any information provided to the professional to help them perform their job (e.g., handover a patient) in the most effective and efficient way. Some examples of job aids mentioned by the interviewees are to-do lists, help about the content and format of handover procedure, and checklists. Job aids decrease memory load and thereby reduce the chance that professionals involved in handover situation commit an error or make a slip. More sophisticated but more effective types of job aids are electronic performance support systems (EPSS - Gery, 2002; Rossett, & Schafer, 2006).

EPSS emerged as an attempt to address some issues with formality, inflexibility and transfer of knowledge and skills attributed to traditional training. The shortest definition of EPSS is just-in-time, just-enough, and just-at-the-point-of need computer support for an effective and efficient job performance. EPSS are software applications that help people to do their job effectively and efficiently without having attended a formal training before. The help is embedded in the process of performing tasks as the interface of the software suggests professionals what to do and how to do it. Cheah and colleagues (2006) implemented in an existing electronic information system a “handover wizard” to support junior doctors in finding the information needed for handover.

EPSS is a promising effective and efficient solution for implementing good handover practices. Very recent developments in healthcare are mobile performance support systems and the first results are quite encouraging. The mobile devices can contain drug information, interaction decision tree, treatment strategies, clinical guidelines, and evidence-based medical information. In a survey conducted in 2005, 84% of the 2,800 medical professional believed that they significantly decrease medical errors by using mobile clinical decision support systems (Adkins, 2006). Another study (Cheah et al., 2006) reported that the possibility to view handover information on a personal digital assistant (PDA) is an important attraction of such system.

Job aids and performance support system might be necessary conditions for transferability of training outcomes but they are not sufficient conditions for sustainability of training solutions. Sustainability of training requires establishing a new learning culture, which would be part of redesigning clinical system.

E.6 Redesign of the clinical system

Redesign of clinical system is based on the system approach to human errors in medical domain. The underlying assumption is that we can not change human conditions, but we can change people’s work conditions (Reason, 2000). The same environmental conditions
may provoke the same mistakes committed by different people. Redesign of clinical system requires finding these latent weak parts of the system that make people vulnerable to commit errors. These latent variables can be administrative regulations, decisions made, clinical guidelines developed, and format of artefacts produced. However, it should not be expected that training in handover can resolve issues related to clinical systems such as national and institutional regulations, work loads or organizational structure. Training can contribute only partly to the redesign of clinical systems. That is, a well-designed training can contribute to resolving some of the organizational cultural issues underlying handover problems. For example, it is believed that the communication training approaches such as ISBAR, Five Ps, and I-PASS-THE-BATTON have the potential to transform ‘blame culture’ into ‘reporting culture’.

E.7 The role of technology

Two technology-enhanced learning solutions have been already discussed in the previous sections are Enabling Learning in Communication for Safety (HELiCS) and Electronic Performance Support System (EPSS). Some studies emphasize the role of existing information systems for an effective handover practice (Arora, et al., 2006; Shoiania et al., 2006). Cheah et al. (2005) manage to extract relevant data from two existing institutional electronic information systems and to present the results under a number of handover headings in a single screen. The survey, which the authors conducted with a small number junior doctors revealed that only 20% of the patients had incomplete handover information and 85% of doctors say that handover items reminded them what investigations are needed to be done and what laboratory results needed to be reviewed. Using the electronic handover, 100% of the respondents knew where their patients were. However, only 71% knew what was wrong with their patient and only 57% knew what decision had to be made. Only half of the handover data were updated over the weekend and only 13% (the lowest percent) answered positively to the item “Do you know if discharge summaries were done.” Electronic handovers forms could be very useful solution. To be implemented in practice, however, they need to be perceived by the users as simple, informative, easy of use, time-saving and practical.

Web 2.0 applications such as wikis and blogs would be very useful for knowledge co-construction and sharing regarding handover. Wikis and blogs are getting extremely popular in many professional domains including health care (see for more details Boulos, Maramba & Wheeler, 2006). If used in a wise way, these applications could enhance learning experience of clinicians, students and patients. Wikis and blogs are easy to use, do not require special technical skills, most of the software that support them is open source and hosting options typically are free of charge. Contributors to wikis and blogs only need to concentrate on delivering high quality content.

Wikis and blogs, however, have some serious drawbacks, namely (a) protecting patient anonymity; (b) lack of control on content; (c) copyright issues; and (d) discouraging the feeling of authorship (Boulos, Maramba & Wheeler, 2006). There are a number of measures that could effectively deal with these disadvantages. Some of them are monitoring and moderating posts, rollback function, protecting good quality text through applying read only function, and blocking some users. The best option for the HANDOVER project would be so called ‘closed environment scenario with a dedicated readership’. In this case, the HANDOVER blog owner can invite, check or limit the wiki
and blog registration. Postings/editing will be only open for selected and trustworthy people. Others will be able to read the materials, post some comments, and if defined by the handover project community as a reliable contributor, s/he would be invited to become a member of the community. The HANDOVER project can use a wiki and a blog to open a discussion about handover issues. Contributors are not only the project partners but also high profile external experts.

Using technology for handover training could be very useful. However, it should be taken into account that *technology alone is neither the problem, nor the solution*. The use of technology should always be combined with evidence-based instructional methods.

**E.8 Preliminary interview results**

The results from the interviews were used to gain more insight in the practical aspects of a training in handover, such as the group composition, the duration of the training and assignments. Regarding the group composition the majority of the training specialists answered that groups should be heterogeneous (i.e., both nurses and specialist or specialist and General Practitioners), because in this way both groups of professionals learn from each others and are enable to take another perspective in the handover situation. Regarding the duration all argue that the training should not interfere with daily practice and should therefore take no more than 4 hours. With respect to assignments, the majority of the training specialist is in favour of providing assignment before the training to focus attention. Providing assignments during training should focus on practicing of skills, gaining more insight in how communication works and should especially focus on creating awareness of the importance of effective handover practice and critical self-reflection on current handover practices. The only aspect of the training, the training specialists did not always agree on, is the use of role play and simulation. Some argue that this is the most effective way of training, whereas others are sceptic and say that participants are not keen on this type of training, which will negatively influence the effect of the training.
Appendix F. Transfer of training

Introduction

After discussing the training content (i.e., *what* should be trained) in Appendix D and all aspects concerning the training design (i.e., *how* to train) in Appendix E, Appendix F discusses different prerequisites and conditions that are essential for the *effectiveness* of training. Organizations invest in their human capital by letting their employees participate in training, workshops or courses. They assume that employees’ skills will improve by attending this training, which in turn will improve their performance at work and in the long run the performance of the entire organization. However, reality shows that investments in human capital are often far less effective than expected. The majority of what is learned during training is not applied - as originally planned or intended – by the employees in their daily work (Latham & Crandall, 1991).

Fortunately, research on the effectiveness of training and learning has revealed several factors that can influence the effectiveness of training and learning. In this appendix an overview of different factors that contribute to the effectiveness of training and learning is presented and practical implications are described for a training in handover.

F.1 Data collection

For this phase two types of resources have been used: literature and interviews with trainings specialists. Literature was selected on the basis of the experiences of the authors of this report. We have deliberately selected the publications that emphasize the need for training for impact and which stress the importance to take care of prerequisite and conditions to establish transfer of training. Two questions from the interviews with training experts were selected for this foci of the training needs analysis: question 20 (i.e., “What conditions should be met to enable the staff to put into practice what they learned during training?”), and question 21 (i.e., “Do you have any suggestions for how current conditions could be improved in order to enable staff to apply what is learned?”). In addition, answers to question 12 (i.e., “What would you advise regarding follow-up sessions?”) and question 15 to 17, regarding how to cope with resistance to participate in training, were used for this purpose.

F.2 Levels of effectiveness

There are several approaches to measure the effectiveness of training. The most famous one is Kirkpatrick’s Four level model (Kirkpatrick, 1994). According to this model, evaluation of training effectiveness consists of four levels: Response, Learning, Performance and Results. In the next sections, each of the levels is described in more detailed and factors that influence the evaluation results of each level are discussed.

Reactions

At the first level, training participants are asked to evaluate the training after completing the program. In their simplest form the evaluation sheets measure how the participants liked the training. The outcomes of this evaluation are partly influenced by training participants’ personal perceptions and beliefs, but also by more objective factors. It is
quite obvious that conditions such as a well-equipped training room, a skilled and enthusiastic trainer, well designed training materials, and sufficient time for breaks have a positive influence on the training participants’ satisfaction and evaluation of the training.

**Learning**

Level two in the Kirkpatrick model focuses on measuring learning results. It focuses on the intended results of the training in terms of improvement of skills and knowledge and change in attitudes. In the context of a training in handover it would mean that after the training, participants are able to use the communication model during handovers and have become more aware of their responsibilities during handovers.

**Performance**

The third level entails measuring the ability and willingness of training participants to retain the new knowledge and skills and to transfer these back to the daily job. This is usually defined as transfer of training (Baldwin & Ford, 1988; Gielen, 1995). For a training in handover this would mean that training participants -after they have returned to their job- consistently apply what they learned during training, in the performance of handover processes at work. Lack of transfer of training is mainly caused by the absence of optimal conditions to apply what they have learned during the training, such as time to practice what was learned or tools and equipment that are also used during training. Furthermore lack of cooperation of managers and colleagues, accompanied with negative feedback (e.g., ‘We always did it this way, why should we change our way of working?) negatively influence transfer of training and training participants’ performance in the workplace.

**Results**

The fourth level in Kirkpatrick’s model evaluates the impact of the training program on the performance of the organization (e.g., the hospital department). To achieve positive evaluation at this level, transfer from the training setting to the daily job is a necessary condition, but more factors need to be taken into account (Philips, 2003). A possible outcome on the organizational level in the contexts of handover is for example a reduction of the number of adverse events and near misses in handover processes. To achieve this, care givers have to apply the acquired necessary knowledge, skills and attitudes in their daily job (transfer), but organizational policies should also support this new behaviour. Regular investments, such as attention of senior management in terms of time as well as financial resources, to keep the topic of handover at the organizational agenda will definitely contribute to achieving the desired organizational outcome. Training is thus merely an event that at the best will guarantee employees possess the required skills, knowledge and attitudes. However, to assure the permanent application and further development of these skills, knowledge and attitudes, other interventions are necessary.

**Focus on transfer of training**

Though it is generally acknowledged that training effectiveness consists of four levels, the examination of effects on the fourth level, the organizational level, is an under-researched area (Philips, 1996) and includes many factors that are entirely out of the
scope of learning and training specialists. Likewise, this appendix focuses primarily on the third level, the level of the transfer of training, while touching also on the first and second level. With respect to the fourth level, this deliverable will stress the importance of taking into account this fourth level and will provide some general guidelines. However, these will not include the specific steps to be taken at the organizational level.

F.3 Factors that influence the transfer of training

Transfer of training is generally defined as the degree to which trained employees effectively apply the training content (skills, knowledge and attitudes) in their daily job and maintain over a substantial period of time (Baldwin & Ford, 1988). The degree to which transfer of training will be achieved depends usually on a number of factors that can be grouped into three categories: (a) training factors, (b) participant factors, and (c) factors embedded in participant’s workplace. Figure F.1, which is based on Baldwin and Ford’s (1988) transfer model, presents the interrelatedness of these factors. The next sections will discuss the factors and also their interrelatedness in more detail.

![Figure F.1. Model of the three categories of factors that influence the transfer of training and their interrelatedness.](image)

F.4 Training factors

Training factors that can influence the transfer of training include instruction, use of materials and equipment, training locations, and assessment. Traditionally, research on transfer of training focused on the effects of improving training design. However, most of these studies were carried out with students and in schools (see Baldwin & Ford, 1988) which reduces the value of the findings for this deliverable. The studies that were conducted in organizational settings, however, often present findings concerning transfer of routine skills for blue-collar workers, which harms generalisation of the findings to the medical domain. Nevertheless, these studies offer some food for thought and point out various aspects which are important during the process of designing and delivering training. Some guidelines that could be deduced from these studies are:
- Enhance similarity between training and workplace
- Select appropriate instructional design strategies
- Develop transfer intentions during training
- Organize follow up activities

Enhance similarity between training and workplace

Regarding the first guideline, it has been shown that the similarity between training and workplace plays an important role in improving transfer (Holton et al., 2000). When participants experience that the training will be of great help for them to perform their daily duties – because the training highly matches the requirements of participants’ daily work – they are much more willing to apply in their work what was learned during training (Velada et al., 2007). The degree of similarity can be increased by using for example authentic cases and examples which are linked to participants’ experiences. If examples are used, it is recommendable to start with examples of high quality performance. These will contribute more effectively to the development of participants’ mental model for performing that particular task in their daily practice (van Gog, 2005). When participants’ understanding of the subject increases, the introduction of examples of less effective performance might help to foster the further development of their mental models of the task performance.

Another approach to enhance similarity between training and workplace is to deliver the training (partly) as on-the-job training in the participants’ daily work setting (Jacobs & Jones, 1995; Jacobs & Park, 2009). However, this will only be effective if necessary precautions are taken to exclude severe risks for patients, training participants and others. In such cases, training in the actual workplace can only be considered as a valuable training context when it is preceded by off-the-job training. In fact, this is common practice in most educational programs for medical professionals (Dornan, 2005; Wagenaar, 2008). An appealing alternative for training in the authentic workplace is the use of real-life simulations and virtual reality environments. For example, patient simulators have been used widely for educational purposes, especially in anaesthesia (see Müller et al., 2007). The main advantages of this alternative lie in the decreased risks, the possibilities to adjust the complexity of the training tasks to the participants’ competence levels and the opportunities to practice events that seldom take place in daily reality but are essential for good performance. Virtual reality is emerging and in the medical profession already utilized for the training of various complex skills. A major disadvantage is that the design and development of virtual reality environments still require substantial (financial) resources. Promising alternatives are the use of an existing environment, such as Second Life, but to our knowledge, there are no thorough evaluations available that list the pros and cons of using this particular environment for training and learning purposes.

Select appropriate instructional design strategies

Regarding the second guideline, it is important to select an instructional design strategy that matches the requirements of the task to be trained. It goes without saying that learning to perform handovers in an effective and efficient manner is a complex task which can not be performed totally as a routine task. This observation has several consequences for the selection of instructional design strategies for the training. Complex
Deliverable D1

skills and knowledge can only be trained effectively when participants are encouraged during the training to analyze and reflect on their thinking and behaviour. This helps them to develop a sound mental model of how to perform handovers (Jelsma, 1989). Offering sufficient opportunities for analysis and reflection during the training prevent participants from developing a fixed, rigid mental model which result in performing all handover processes in a routine-like way, neglecting the specific requirements and signals of each individual patient. By letting the participants analyze and reflect on each specific handover, they develop a more comprehensive mental model, which helps them to adapt their behaviour and decisions to consequent handover situations. A promising instructional approach that has shown to be successful for the training of complex skills is the four-component instructional design model (4C/ID-model; Van Merriënboer, 1997; van Merrienboer & Kirschner, 2007) described in Appendix E. Taking the design principles of this approach into account (e.g., authentic tasks, scaffolding, variability, supportive information and part task practice) and the aforementioned principles of analyzing and reflection when designing a training in handover, the transfer of training to the workplace will be enhanced.

Develop transfer intentions during training

The third guideline with respect to training factors is to prepare participants during training for the application of the training content in their daily job, after the training. Based on insights gained from studies with drug addicts participating in programs to prevent them of falling back in addictive behaviour (Marx, 1982; 2000), it is recommended to include ‘relapse prevention’ activities in training programs. These activities encourage participants to envisage how they are going to use the new learned skills and knowledge in their own daily practice after the training and what obstacles they will face and how they will cope with these obstacles. Research shows that including these additional activities in training, significantly increases the level of transfer (Gielen, 1995).

Organize follow-up activities after training

Heaven, Clegg & Maguire (2006) reported that supervision after a workshop supported nurses in their attempts to apply the learned communication skills in their daily job. Supervision was provided on a one-to-one basis and was performed by a trainer who also conducted the workshop. The supervision included discussion of cases and workplace observation. The contribution of follow-up activities was also recognized by Shafer, Rhode and Chong (2004) who found that workshops did increase participants (behavioural health professionals) interviewing skills but were insufficient to guarantee its long-term application in participants’ daily jobs. For that to occur they assume that some form of guided practice and supervision is necessary and in their opinion the use of distance education technologies can be very helpful to arrange this in a practical and accessible manner.

Though results are promising it remains difficult of course to rely solely on the availability of professional trainers to conduct follow-up activities. Authors like Billett (2003) and Poell et al. (2006) suggest that offering support in the workplace is not restricted to skilled professional trainers. These authors suggest that senior employees who receive some additional training in mentoring techniques are very well able to serve
as informal mentors or trainers who can support their colleagues in furthering their transfer, but empirical evidence supporting the effectiveness of this suggestion is lacking.

F.5 Participant factors

Learning and subsequent transfer to the job will only occur if participants have the abilities and the desire to learn new knowledge, skills and attitudes and the motivation to apply what is learned in their own work. Though training design factors and factors embedded in the work setting contribute significantly to learning and transfer, participant factors account for most of the variability in learning and transfer outcomes (see for example Gielen, 1995; Holton, Baldwin & Naquin, 2000).

Sadler-Smith and Smith (2004) point at the fact that taking into account participant factors, such as differences in experiences, motivation and preferences, is generally recognized as important, however, the everyday practice of instructional designers and trainers demonstrates the opposite is common practice: learners are usually treated as they are all more or less identical. Though this might increase the efficiency of designing and delivering training and learning, it definitely is counter-productive from the viewpoint of increasing its effectiveness. Or as the famous scholar Campbell once expressively stated: ‘We need to remind that participants do not fall out some great participant bin in the sky. They probably have rather long and varied organizational histories, which have created certain attitudes, values and behaviours relative to specific training experiences’ (Campbell, 1989, p. 479). In this section we will subsequently discuss some of the most essential participant factors that need to be taken into consideration for designing and delivering effective training and transfer:

- Prior knowledge and experiences
- Motivational aspects
- Learning style
- Learning preferences

Establish sufficient links between training and participants’ prior knowledge and experiences

For learning and training events it is essential to assure that there is a link between participants’ prior knowledge and experiences on the one hand and the content of the training on the other hand. If this link is too weak or absent the effectiveness of learning and transfer will be undermined. The quality and variety of participants’ work experiences can be seen as a strong predictor for participants’ future possibilities to change their behaviour (Quinones et al., 1995).

Special attention needs to be given to training and learning events that attempt to alter deeply rooted routines and beliefs to establish more effective handover processes. In this particular case participants’ prior knowledge and experiences may interfere strongly, and become even counterproductive, with acquiring new knowledge and skills. The learning and training will only become successful if sufficient attention is paid to raising participants’ awareness about their current routines and beliefs and why these need to be altered in order to increase the quality of handovers. This is a quite delicate process in which it is necessary to avoid ‘blaming’ participants for their current routines and beliefs.
and at the same time convincing them that learning to handle the new handover procedure is worthwhile and feasible.

Experiencing a gap between one’s current performance and what is actually required in the workplace may serve as a powerful trigger to attend training and learning events. However, their readiness to learn will decrease significantly or they will even attempt to avoid participation in training and learning events, if learners experience this gap as impossible to bridge (Jarvis, 1987). It goes without saying that involvement of participants’ managers and other significant stakeholders is a prerequisite for increasing participants’ readiness: it is not exclusively the task of those who are responsible for designing and delivering training and other learning events!

Pay attention to participants’ motivation to attend training and to transfer to the job

Motivation energizes or creates enthusiasm for the training, is a stimulus that guides and directs learning and the mastery of the training content and influences and promotes the application of what is learned (Naquin & Holton, 2003). This definition reveals that there are two types of motivation: (1) motivation to learn, and (2) motivation to transfer what was learned to the own job. Only if participants possess both types of motivation, possibilities are high for realising actual changes in participant’s job performance (Baldwin, Ford & Naquin, 2000).

Not surprisingly, studies have indicated that participants’ motivation to learn is a strong predictor for learning results, while motivation to transfer is one of the main predictors explaining differences in transfer outcomes (see the discussion of research in Naquin & Holton, 2003). Moreover, participants who are motivated to learn are also likely to be motivated to apply the skills they developed during training once back on the job (Naquin & Holton, ibid).

There is sufficient empirical evidence to assume that motivation, either to learn or to transfer, is closely linked to other characteristics of participants and related to characteristics of the training and the work environment as well. For example, motivation is strongly linked to participant’s self-efficacy. Self-efficacy refers to the belief in one’s capabilities to exercise control over events to accomplish desired (training) goals (Woods & Bandura, 1989). Participants who have higher levels of self-efficacy are more willing to be engaged in learning and are more challenged and persistent in seeking opportunities to apply what they have learned (Chiabura & Marinova, 2005; Velada et al., 2007). Also participants’ expectations contribute to their motivation. If participants expect that attending training and applying what is learned will likely contribute to achieving positive outcomes that are meaningful for them (e.g., good appraisals, more satisfying work), their motivation will increase significantly (Gielen, 1995; Holton et al., 2000).

The abovementioned studies imply that motivation is not fixed but can be influenced by well-considered interventions and actions. Based on their substantial research experience Baldwin, Ford and Naquin (2000) outline some very concrete and practical principles for improving participants’ motivation for training and transfer. They propose, for example:
- Set explicit training goals. Have them set by management rather than by training designers or trainers.
- Do not assume that participants believe they can master the training content and transfer it to their work. Find ways to instil confidence in participants that they can succeed in the learning activity, and try to frame learning activities as opportunities rather than threads.
- Do not simply pronounce the importance of learning. Rather, assure that managers are participating in the training or even lead training sessions. Find ways to link the participants’ learning outcomes to any meaningful organizational reward.
- The motivational value of voluntary participation has not been demonstrated. Attendance should be required for any significant training initiative. Moreover, training groups should not be randomly created. There should be active management of the composition of training groups.
- Seek ways to require learners to make a significant public (and ideally written) commitment of their intention to transfer their training to their own job.

**Participants’ learning styles are to a certain extent changeable**

Learning style refers to the tendency to use a particular combination of learning activities that a person can, and likes to, perform. The person adapts the combination of learning activities to each situation differently. This particular combination is called the actualized learning strategy (Berings, Poell, & Simons, 2005). Learning style thus encompasses an individual’s habitual information processes mode (cognitive style), behaviours (learning style) and predispositions (learning preferences) that together determines how a person responds to a certain learning or training context.

Though individuals differ in their learning style the question remains how to consider this from the viewpoint of designing learning and training. As a rule of thumb Sadler-Smith and Smith (2004) propose to be at least aware of the fact that participants differ in their learning style and further they offer practical suggestions. Variation in instructional activities is the key word. For example, introducing a new subject by presenting the theory behind it but also by offering examples or having participants engaged in an exercise that allow them to experiment with the subject. Especially the latest technologies that are applied in education (for example e-learning) offer more possibilities to take into account differences in learning styles.

There is evidence to suggest that workplaces differ in their tolerance for particular learning styles, which will presumably also impact the transfer of learning. For example, workplaces differ in ‘mental space’ for experimenting with tools, patients and processes, or the possibilities for reflection while performing work activities (Boud, 2006). These workplace characteristics partly shape the use of actualized learning strategies by employees. Large differences between instructional formats of training and learning events and learning styles employees usually perform at work may cause some obstacles for employees to accommodate their learning to the instructional format.

There is a vivid debate on how learning style is actually linked with learning and transfer outcomes. Norman (2009) discussed studies conducted in the health sciences by Cook et al. (2009) in which there appear to be no relationship between learning style, instructional format and learning outcomes. Other studies discussed by Norman showed that learning style did matter in explaining differences in learning results, though the
percentages of explained variance were usually very, very modest. Comparable findings were reported by Gielen (1995) and Van der Klink and Streumer (2006) in their studies on transfer of training. Moreover, as Sadler-Smith and Smith (2004) acknowledge, individuals may have a rooted tendency to approach learning situations in a particular way but this does not imply that they are not able to use another learning style than their own preferred learning style. This also becomes clear from the study conducted by Groves (2005) among first-year medical students. It appears that participants move out their comfort zone which will be more likely to occur when the training is in the hands of skilled and knowledgeable trainers.

Consider what learning preferences are really essential

As already indicated in the previous sections it is broadly recognized that adults differ in their traits and preferences but the question remains whether designers and trainers need to take these differences in account and to what extent? It is quite likely that training participants will differ in their appreciation of the following instruction formats:

- Training in a lecture mode <> more self-directed learning
- Individual learning <> team learning
- E-learning <> face-to-face meetings
- Learning in a training setting <> learning in the own job setting
- Learning with members of the own ‘professional tribe’ <> learning in mixed groups.

Because of the many different learning preferences it is quite difficult to determine in this stage of the needs analysis the most appropriate preferences to take into account. Though it is acknowledged that learning preferences matter, there is not always a one-to-one relationship between preference and consequences for designing the training. Some preferences can be regarded as changeable and can be addressed in other ways than altering the design of the training.

F.6 Factors embedded in participant’s workplace

During the last twenty years quite some research has been devoted to the impact of workplace factors on learning and transfer, resulting in significant progress in our understanding of the influence of these factors (Wieland Handy, 2008). These findings also increased the awareness that improving workplace factors is not always an easy task, at least from the perspective of training and learning specialists, because it is generally outside their immediate scope of job responsibilities. Close cooperation with other stakeholders is therefore necessary for establishing more favourite conditions for transfer and learning at work, as the following sub-sections will demonstrate. Here we concentrate on the factors that are generally acknowledged as the essential factors for enhancing learning and transfer:

- Support and feedback
- Opportunity to perform
- Organizational climate for learning and transfer

Organize support and feedback for training participants
The support and feedback participants receive from their own manager and co-workers appear to be essential for successful transfer. Support refers to all kinds of behaviours that directly, or in a more tacit sense, reinforce the participants’ transfer efforts. For example, the manager shows interest in the participants’ experiences during the training or he expresses the importance of transfer and learning for achieving better work performance. Feedback refers to the information participants receive about their attempts to apply what was learned during the training.

Some studies have indicated that the role of the manager is more significant for explaining differences in transfer outcomes than the role of co-workers, while other studies indicated the opposite is more true (see for example the studies discussed in Cromwell & Kolb, 2004; Velada et al., 2007). Apparently, aspects such as the nature of the work, the professional culture, autonomy and the division of labour, among many other aspects, play a role in explaining differences between the impact of the manager and co-workers. For example, van der Klink, Gielen and Nauta (2001) suggest that in organizations in which self-directed teams are implemented the impact of managers on the performance of employees fades into the background, while feedback and support of co-workers become more prominent.

Some experiments were conducted to examine how to maximise the role of line managers in reinforcing transfer (e.g., Brinkerhoff & Montesino, 1995; Nauta, 1994). Managers were, for example, instructed to schedule a meeting with participants after the training to discuss their learning experiences and to determine opportunities in the workplace to apply what was learned. These studies show that it is possible to convince line managers of their role in maximizing the transfer. However, really exhibiting more supportive behaviour is for most line managers only achievable when they themselves receive sufficient coaching and guidelines. Moreover, these studies indicated that the impact of support and feedback is not limited to the post-training phase but appears also to be relevant prior to the training event.

Arrange sufficient opportunities to perform

It is quite obvious that transfer will only happen when training participants perceive opportunities to apply what they have learned in their jobs; if there are few or no opportunities, then it is unlikely that transfer will occur (Baldwin & Ford, 1988). This absence can be caused by different factors. For example, training participants learned something that does not correspond with their (current) work activities, or the timing of the training was not aligned with assignment of tasks and projects of the employees who attended training. Moreover, if there exists a considerable time interval between training and opportunity to perform in the workplace, it is quite likely that transfer is not always assured. In fact, a negative side-effect will occur: it will undermine participants’ morale for future training events. Training in advance is usually not a recommended strategy!

Clarke’s (2002) qualitative study among social service professionals shows that opportunities to perform are strongly linked to several workplace constraints. The availability of up-to-date equipment, access to relevant information, heavy workload and the impossibilities of management to overcome these and establish more favourable work conditions, are indicated as factors that inhibit sufficient opportunities to apply what was learned in training during their daily job.
Be aware of the impact of the organizational climate

It is generally acknowledged that the organizational climate plays a subtle and tacit, though considerable role when learning and transfer is at stake. Some authors define climate as learning climate (Baars-Van Moorsel, 2003), while others propose the term organizational climate (Burke et al., 2008; Lim & Morris, 2006), workplace climate (Kirby et al., 2003) or organizational transfer climate (Rouiller & Goldstein, 1993).

Though the somewhat different labels refer to slightly distinct definitions, there is consensus on the significant impact of climate on learning, transfer and performance. Next, there exists some agreement upon the idea that climate refers to a psychological, multidimensional and complex phenomenon (McMurray, Scott & Pace, 2004) that comprise different factors, procedures, beliefs and values that signal to people what is important.

Rouiller and Goldstein (1993) developed a scale to measure the organizational climate for transfer of training. Their scale consisted of items referring to situational cues and consequences. Situational cues comprise cues arising from goals that trigger the application of the training content. The distinguish the following cues: (a) social cues such as the conversations at work and support provided by others, (b) cues related to job tasks such as the availability of equipment, and (c) self-control cues that refer to how training participants sense the space for applying what was learned. Consequences comprise (a) the feedback, negatively or positively, and (b) the lack of feedback on their transfer attempts that participants experience at work. This definition shows there is considerable overlap with the previously discussed literature on support and feedback of co-workers and managers and opportunities to perform (e.g., the notion of task cues matches with constraints as discussed in the section on opportunities to perform). The same goes for the climate conditions proposed by other transfer of training researchers (e.g., Clarke, 2002; Lim & Morris, 2006; Velada et al., 2007).

Almost all research studies on transfer of training that measured climate aspects demonstrated its significant contribution to explaining differences in training participants’ transfer levels. Climate aspects generally contributed more significantly to transfer than training design factors. Though it is difficult to get sufficient understanding on the multiple, and partly less tangible, aspects of a transfer climate in a particular workplace, and the possibilities for improvements are likely modest and will presumably require considerable efforts, from the perspective of learning and transfer it is definitely unwise to ignore this factor.

In addition to the role of transfer climate, Burke et al. (2008) point in their meta-analysis at the impact of an organization’s safety climate and how this shapes learning, training and transfer within organizations. Their findings indicate that a safety climate focusing on ensuring predictability and uncertainty avoidance is linked with (1) the use of training methods that allow less active learning activities, and (2) lower effectiveness levels of health and safety training in reducing negative outcomes. It is likely, according to Burke et al. (2008), that a climate with a high uncertainty avoidant culture provide highly standardized, structured training (e.g., lecture, viewing video) while more unstructured training methods (e.g., role-playing, discussion) offer training participants more opportunities to become more actively engaged and enhance a more comprehensive understanding of safety knowledge. They also reported findings indicating that if an organization’s climate is strategically focussed on safety, then safety training will prepare
employees to engage in activities that lead to fewer accidents and injuries. Finally, Burke and his colleagues (2008) mention some findings concerning the impact of national culture on safety climate. However, these findings are less clear but do provide some indications that nations differ in organization’s safety climate and likewise in the design of training and its transfer outcomes to reduce faults.

Interrelatedness of factors

There is a strong interrelatedness between the various factors that together are responsible for training effectiveness. A single factor can not be regarded as the ultimate panacea for establishing high levels of transfer. For example, experiments revealed that transfer intentions (i.e., training factor) are only successful for participants who are able to (i.e., i.e., participant factor) manage their own work and learning on the job (see, for example, Gist et al., 1991). Moreover, training participants differ in their transfer goals (Chiaburu & Marinova, 2005). While some participants are more learning oriented and aim at becoming better, others have more performance orientated transfer goals and just want to be able to perform the task. Though developing transfer intentions is a useful strategy, Den Ouden (1992) demonstrated, that transfer intentions (i.e., training factor) as such do not increase the transfer to the daily work. Only if participants experience sufficient support (i.e., workplace factor) of significant others in their workplace (e.g. co-workers, managers) they will be sufficiently motivated to apply the learned skills and knowledge.

In some cases, developing transfer intentions during training is not necessary, because it does not have any added value. For example, research by Gaudine and Saks (2004) conducted with nurses, shows that when the training is based on a thorough needs analysis and designed and delivered effectively, transfer will increase because of these conditions and participants’ transfer intentions do not have any added value. Moreover, the authors showed that that when the daily work setting encourages strongly the application of the learned skills (e.g. support of managers is guaranteed) training participants have numerous opportunities to put immediately into practice what was learned during training.

Another example is that the complexity of the issue of opportunities (i.e., workplace factors) becomes apparent when taking into account the differences between training participants (i.e., participant factors). Some participants see, or even create, opportunities while others need more support and reinforcement (e.g., from their supervisors) to discover appropriate opportunities. This difference in opportunity-seeking behaviour stems from participants’ motivation to transfer and is also related to their more profound attitudes concerning their willingness to be engaged in learning endeavours (Van Eekelen, Vermunt & Boshuizen, 2006).

From these examples it becomes clear that in order to establishing high levels of training effectiveness it is important to analyse and operate on a transfer system level in which all factors and their mutual interdependencies are considered together (Holton, 2000).

F.7 Preliminary interview results

During the interviews with training specialists various themes were discussed that are related to the issue of assuring effectiveness of training events. Here the main findings of these interviews are summarised. In general the answers of the training specialist reflect
the findings from the literature study. No strong cultural differences could be identified regarding the questions related to transfer of training. Regarding the question on how to increase participants’ willingness to attend training in handovers. Most often mentioned was that providing information about faults and adverse events will increase the motivation for attending training. Some training specialists added to this that just pointing at bad experiences is insufficient and they stressed the necessity to show examples of good practice and its positive results. It was also emphasised that it is recommendable to use more than one communication channel to spread the message to the prospective training audience. They warned not to rely solely on written information (printed in brochures, newsletters etcetera) but to use other communication modes as well to assure that the message cannot be missed, such as presentations at conferences and the use of internet (video clips) and even clips already present on YouTube.

The majority of the interviewed training specialists advocated that participation in handover training needs to be mandatory, but this will only work well when training events are scheduled during working hours. In addition, two participants mentioned that participation can only be mandatory when the training is part of the organizational strategy employed for handovers: ‘it needs to be voluntarily unless it is part of the organizational strategy’. However, often there is not a real basis for forcing employees to attend training in handovers: ‘there are no legal requirements forcing participation. These trainings are not included in post graduate training programs’.

Though some training specialists feared that when there is not enough pressure on employees then they will not attend voluntarily, others, however, are not convinced that forcing training attendance will be helpful: ‘I don’t believe in mandatory education’.

The training specialists emphasized that it is worthwhile to evaluate the long-term outcomes of the training. The usability of a questionnaire to collect data on how training participants experienced the training and their learning results is acknowledged by them. In addition, some of the training specialists mentioned to combine the questionnaire with a group discussion, role playing or short essays to gain more in-depth insights into achieved learning results at the closure of the training event.

There is broad consensus among interviewed training specialists that it is important to collect data on the long-term impact of the training on participants’ behaviour in the workplace and the number of adverse events, incidents, and patients’ complaints etcetera. At the same time training specialists perceive it as quite difficult to collect reliable information on the long-term impact of the training. Especially the Polish training specialists are quite reserved about the actual possibilities to collect data on the impact of the training: ‘Measuring adverse events before and after the training seems interesting, but how to organize this?’.

In general training specialists acknowledged that only training is not enough to change handover practices. In addition to training they mentioned various conditions that are essential for effective handovers. The following were mentioned:

- Include handover training in curricula of medical and nursing schools.
- Make sure that management support improvements of handover practices.
- A checklist that includes all crucial elements of handovers is very useful.
- Use both written and visual information.
- ICT can be very helpful to structure handover protocol.
F.8 Implications

In the previous sections of this Appendix various aspects of the complex issue of training effectiveness have been discussed. This final section attempts to synthesize the main implications. A first implication is that training is generally considered as a valuable intervention to increase participants’ knowledge and skills. However, it is not sufficient to assure long-term impact on participants’ behaviours. In general, training specialists have a tendency to overrate the contribution of training characteristics to establishing transfer of training, while research findings point at the rather modest contribution of training variables to achieving high levels of transfer of training (e.g., Lim & Morris, 2006).

Second, there exists a strong interrelatedness between the various factors that influence the effectiveness of a training. This implies that a strategy which focuses solely on one of these factors (e.g., improving training participants’ motivation) will be insufficient to assure the long-term impact of training. Establishing high levels of training effectiveness is achieved by a comprehensive, holistic view rather than being focused on a single factor. It is thus important to analyse and operate on a transfer system level in which all factors and their mutual interdependencies are considered together (Holton, 2000).

A third implication is that to establish transfer of training, the factors should be considered before training actually is designed or delivered. That is, the attention for transfer of training does not need to be limited to the post-training phase.

The fourth implication concerns the need to collaborate closely with others to establish high levels of training effectiveness. Though training specialists are usually accountable for the quality of the training, its long-term effects (e.g. transfer to the workplace) require the involvement of other stakeholders as well, such as heads of departments, handover specialists and so forth. If this close collaboration is not established, the training will very likely not considered as part of the solution. It will be regarded as an event that does not add any significant value, or it will even become part of the problem!

The fact that some of the factors that strongly influence the effectiveness of training are quite difficult to modify overnight (e.g., behaviour of supervisors, organizational climate) can be regarded as the fifth implication. This is not a plea to entirely exclude or neglect these factors. Rather it is a recommendation to carefully consider what can be improved and influenced within a given context and with the available means.

Finally, the sixth implication is that factors differ per national context. For example, preliminary interview results indicate that for instance in Poland it is not possible to make attendance of handover training mandatory due to the local labour relations, whereas in the Netherlands there are some possibilities to make a training mandatory. A consequence of these differences between national contexts is that a one-size-fits-all strategy to enhance transfer of training will presumably not work very well. However, more information is needed to carefully design context-sensitive strategies that contribute to maximizing the transfer of training.

To conclude, taking all the described implications into account during the design and delivery of a training will increase the effectiveness of the training.