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## Learning in context: Identifying gaps in research on the transfer of medical communication skills to the clinical workplace

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### ABSTRACT

**Objective:** In order to reduce the inconsistencies of findings and the apparent low transfer of communication skills from training to medical practice, this narrative review identifies some main gaps in research on medical communication skills training and presents insights from theories on learning and transfer to broaden the view for future research.

**Methods:** Relevant literature was identified using Pubmed, GoogleScholar, Cochrane database, and Web of Science; and analyzed using an iterative procedure.

**Results:** Research findings on the effectiveness of medical communication training still show inconsistencies and variability. Contemporary theories on learning based on a constructivist paradigm offer the following insights: acquisition of knowledge and skills should be viewed as an ongoing process of exchange between the learner and his environment, so called lifelong learning. This process can neither be atomized nor separated from the context in which it occurs. Four contemporary approaches are presented as examples.

**Conclusion:** The following shift in focus for future research is proposed: beyond isolated single factor effectiveness studies toward constructivist, non-reductionistic studies integrating the context.

**Practice implications:** Future research should investigate how constructivist approaches can be used in the medical context to increase effective learning and transition of communication skills.

### INTRODUCTION

There is compelling evidence that communication affects numerous important and meaningful health outcomes, such as adherence to drug regimens and diets, pain control, and improvements in physical, functional, and psychological well-being [1-5].

Despite the importance of communication, there are frequent reports of low satisfaction with the communication between practicing doctors and their patients [6,7]. Medical education has recognized the importance of communication skills, as evident from the fact that dedicated training programs have become an integral component of the undergraduate medical curriculum.

Paradoxically, however, systematic communication skills training is quite rare during postgraduate training where residents learn in the clinical workplace with day-to-day contacts with patients [8- 11]. This contrasts sharply with research reporting a strong need for communication training at postgraduate level [12]. Rider et al.

[13] for instance showed that less than half of all residents were confident about their more advanced communication skills, such as breaking bad news, dealing with end-of-life issues and communicating with difficult patients and seriously ill children.

O' Neill et al. [14] confirmed that residents feel unprepared for the required extent of emotional involvement with patients. There is an unfortunate discrepancy between this obvious need for training and the absence of communication training programs reaching out to high numbers of residents [10,11]. General practice may be an exception to this situation, since its residency program does pay attention to communication skills on a more regular basis.

Studies on the effectiveness of postgraduate communication training have reported contradictory and variable findings [15- 21]. This suggests that this research area might benefit from a new approach, moving beyond single effectiveness studies to a broader, non-reductionistic view on the issue at hand [18,22]. This paper is an attempt to develop such a broader view.

The broader view on communication skills training we propose in this review is driven by a main problem in the field: absence of consensus on how to define and capture effectiveness. In fact, effectiveness has been defined in numerous ways by many different theorists and researchers. Well-known in this regard are the four levels of evaluation developed by Kirkpatrick (Fig. 1) [23].

In recent years however the suitability of Kirkpatrick's levels to evaluate the effectiveness of interventions has been questioned [24-26,27]. The main critique is that it involves many implicit assumptions [26], masking underlying mechanisms and causal relationships between the intervention and its outcomes [25].

Besides, organizations prefer to measure the first two levels rather than the last two, which are harder to measure [24]. Levels three and four are however most interesting to know, since they measure whether real change has occurred due to the intervention. Looking at effectiveness of communication skills, what we are striving for is an observable change in the communication behavior of clinicians in their daily practice. Hawken [28] defines this as transfer of communication skills from training to daily practice, equaling level three of Kirkpatrick.

If we want to increase this transfer or transition in communication skills, much is to be gained by more clarity about the underlying assumptions of what makes learning and transfer effective.

The objective of this article therefore is to identify gaps in the literature on effectiveness of postgraduate communication skills training and discuss relevant theories and insights in the literature on transfer and learning, to gain more clarity about underlying principles and to guide future research. In order to do so, relevant literature will be reviewed.

More specifically, the following research questions will guide and structure this article: 1. Which gaps can be identified in the research on effectiveness of postgraduate communication skills training? 2. Which relevant insights can be identified in the research on transfer of training and theories on learning, to guide future research in the field of postgraduate communication skills training? We present the results in a narrative review as this format seems particularly suited to comparing and interpreting complex, multi-faceted concepts and findings [29].

## 2. METHODS

### 2.1. Literature search

In this narrative review we present and interpret general findings on medical communication skills training and transfer of training and learning, combining different perspectives. We searched for literature studies, systematic reviews, and empirical studies on the subjects ‘ ‘medical communication skills (training)’ ’ and ‘ ‘transfer of training and learning’ ’. The following keywords were used to search Pubmed, GoogleScholar, Cochrane database, and Web of Science:

‘ ‘medical communication skills’ ’, ‘ ‘medical communication skills training (programs)’ ’, ‘ ‘transfer of training’ ’, ‘ ‘transfer of learning’ ’ and ‘ ‘transfer of medical communication skills’ ’. Manual searches of other relevant journals were also conducted. In executing our search we used an open to closed inclusion strategy. We started by including articles on medical communication skills training in general to look which gaps in the literature they revealed. The titles and abstracts of the retrieved articles were screened, after which the full text of included articles was read. Next, a more closed reference search of the already included articles was performed. This process of snowballing was done until saturation was reached, ending up with five main topics as emerging problems or gaps in the literature. A total of 250 articles written in English and published before November 2011 were included (available from the first author upon request). We conducted a narrative review, to underline the iterative process of literature selection.

### 2.2. Mind maps and iterative validation

During our literature search, the first author composed mind maps to visualize, structure, and classify the findings from the articles. We used this mind mapping as a starting point technique to categorize the data, because it is an effective way to classify chunks of information and show interrelations between the information from the articles included [30]. In this way, we identified five main categories in 250 articles: intervention studies with significant training effects, Intervention studies with no significant training effects, Assessment of communication skills, research needs, and current needs in systematic communication skills training implementation at post graduate level.

#### [FIGURE 1]

From these five categories or groups of papers, five main gaps were formulated. To increase the reliability of the main gaps identified by the first author, we applied an iterative approach. This included cross-validating the main gaps through peer-discussion and evaluation by the co-authors and double checking by four other

experts in the field of communication research. This process was done in several rounds until consensus was reached.

### **3. RESULTS**

#### **3.1. Gaps in the research evidence on postgraduate medical communication skills training**

Since the vast majority of the papers addressed more than one of the gaps described below, no precise number of papers in each of these categories can be provided. However, the gaps are presented in the order of ‘most often mentioned’ to ‘least often mentioned’, where ‘most often’ indicates that more than half of the papers addressed this gap, and ‘least often’ still means that about one third of the papers discussed the issue.

##### **3.1.1. Effectiveness of postgraduate communication skills training interventions**

More than half of the 250 studies have examined the effectiveness of postgraduate communication skills training. A review study by Hulsman et al. [16] showed that the design of many of these studies was weak and that stronger and more valid research designs yielded the lowest training effects. This might reveal that communication training does not necessarily produce the expected results. Bloom [31] also concludes in his review that even though most methods or techniques for continuing medical education proved to be effective, the use of least effective techniques predominates, having little or no beneficial effect in changing physician practice. As a reaction to Hulsman’s review, van Dulmen and Bensing [32] questioned the validity of evaluation techniques, arguing that inadequate evaluation techniques might explain (some of) the negative results and absence of effectiveness. They advised widening the scope of communication skills research and training, arguing that communication does not take place in a vacuum but is influenced by the context in which it takes place [22,33]. Rollnick et al. [34] developed for instance a new context-bound training method, emphasizing the role of an authentic context when designing a communication skills training program. However, measurement of its effectiveness remains a challenge.

The inconsistent results of effectiveness studies may also be explained by the different levels at which effectiveness was measured. It appears that most effectiveness studies conduct evaluations at level 1 or level 2 of Kirkpatrick’s model (Fig. 1).

Hulsman et al. however, also measured level 3 effects by adding independent behavioral observations and patient outcomes to physicians’ self-ratings. Since level 3 effects are more difficult to measure and obtain, this may also partially explain why the more valid research designs revealed the weakest training effects. In order to enhance the comparability of training programs, it would be commendable to arrive at general agreement on how to define and measure effectiveness [15]. Libert et al. [35], Fallowfield et al. [8], and Heaven et al. [36] were among the first to research effectiveness in terms of transfer of medical communication skills from training to clinical practice. They confirmed the paucity of empirical data from methodologically sound studies. In 2010, Lienard et al. [9] pointed out that until then only three controlled studies had shown efficacy in terms of transfer to clinical practice, and that the way transfer was assessed in these studies was good but not

optimal. In response to this, Lienard conducted one of the first studies to assess transfer of communication skills training for residents in a randomized controlled design. It showed that transfer of communication skills was directly related to the training attendance, but the transfer effect remained limited.

Henwood et al. confirmed that evidence for transfer of training to real patient encounters and patient outcomes (level 3 effects) are still scarce [37]. Lienard thus concluded that the next generation of studies should focus on the generalization of transfer of learned skills to different specific clinical situations and on the maintenance of it over time [9].

### **3.1.2. Context-related assessment of communication skills**

Measurement of effectiveness requires assessment of participants' communication skills. However, residents and clinicians often perceive the assessment of their communication skills as subjective [38,39], claiming that not all factors influencing the communication process are taken into account. Since conducting a consultation or building a relationship cannot be atomized into component skills, it is questionable whether it is acceptable to assess communication using behavioral coding schemes that only measure the frequency of some predefined skills and thus do not (fully) take into consideration the context in which the communication occurs [18]. Since context is supposed to influence communication, it should be included in the evaluation of effectiveness to obtain a broader and more realistic picture.

Bensing et al. [22] already suggested to expand the focus of medical communication research to include the context where health care professionals apply their communication skills. According to Hager and Hodkinson [40] much about skills remains implicit and tacit.

Attempts to describe precisely the human capacities that underpin successful performance in a field are always somewhat speculative and, hence, are subject to contestation and revision. This has important implications for the way we look at the acquisition and transition of communication skills as well. Descriptions of performance outcomes should not erroneously be taken as descriptions of the skills that enable these outcomes [40].

### **3.1.3. Clarification research and conceptual models**

As pointed out by Cook et al. in 2008 [41], there is an urgent need for clarification research to advance the science of medical education. Their review showed that only twelve percent of experimental studies addressed questions of 'why did this work' or 'how did this work'. To remedy this, Cook called for increased use of theoretical models in the concepts and designs of medical education studies [41]. This view is supported by de Haes et al.

[42], who stated that the evidence on medical communication is underdeveloped. Conceptual models in this area are still lacking, and will have to be developed to advance the science of medical communication skills training.

### **3.1.4. Systematic implementation at organizational level**

Visser and Wymans [43] pointed to the need for more attention to ways of ensuring systematic and lasting implementation of the effects of communication training, since their study showed disappointing results for the long-term implementation of the effects. They argued that systematic implementation is often poorly developed or missing altogether, as was also demonstrated in earlier reviews of health care

innovations by Grol et al. [44-47] and Greenhalgh et al. [48]. Successful transfer and long lasting implementation require an organization-oriented change strategy at the level of the department or organization [43]. Silverman [11] confirmed that, without nurturing and integration, improvements as a result of communication training are often likely to flounder in the face of pressures from workload, time issues, inappropriate modeling, and apparent failure to recognize the value of this central clinical skill. This confirms earlier findings from Mazmanian and Davis [49] that continuing medical education activities must be truly continuing and not causal, sporadic or opportunistic, to achieve their greatest potential.

### **3.1.5. Mechanisms or factors that (fail to) produce change**

Transfer can be regarded as an essential preliminary step before the actual implementation of newly learned skills. This makes it worthwhile to consider insights from implementation research. Extensive implementation research by van der Weijden et al. [50] and by Grol et al. [44-47] has yielded valuable insights into factors influencing the effective implementation of interventions to improve quality in health care systematically. Because interactions of factors at multiple levels influence the success or failure of quality improvement interventions, an understanding of these factors (the obstacles to and incentives for change) is crucial to an effective intervention [51]. Greenhalgh et al. [48] also emphasized the need for future research to study hypothesized links between interventions and outcomes and the need for refinement of the mechanisms by which and within which these links produce (or fail to produce) change. Along the same lines, Hulsman et al. [16] also concluded that future research might benefit from focusing on factors that inhibit or facilitate physicians' implementation of skills in their actual behaviors in daily practice.

## **3.2. Literature on transfer and theories of learning**

The five main gaps discussed above urged the authors to have a closer look at underlying assumptions of what makes transfer (or transition) of what is learned effective. In the next four paragraphs some main developments in the field of transfer and learning are discussed, since their findings and views have not yet been widely translated to the field of medical communication skills training.

### **3.2.1. Traditional and contemporary schools on learning and transfer**

In several fields outside medicine the importance of the concept of transfer is widely acknowledged. As early as 1958, James Desse stipulated that 'there is no more important topic in the whole psychology of learning than transfer of learning. What has emerged from the stream of research is a view of transfer as a complex and dynamic process [52]. It is important to mention that there are different schools of theorizing about learning and transfer. A main distinction can be made between traditional and contemporary views on learning, each having their own assumptions on transfer. The traditional view is based on behaviorist and cognitive paradigms of learning and considers what is learned as a product that is independent of the learner which can be moved from place to place, separate from the context in which it is learnt [40]. In this view we have failed to achieve transfer of learning at very significant levels [52], thus calling for alternative views on learning and transfer. The contemporary view on learning and transfer on the other hand, is based on the research paradigm of constructivism, which equates learning with creating meaning

from experience. Knowledge and skills are not mind-independent in this regard and cannot be mapped onto a learner, as cognitivists and behaviorists believe.

Instead humans create meaning as opposed to acquiring it [53].

Learners do not transfer knowledge from the external world into their memories, rather they build personal interpretations of the world based on individual experiences and interactions [54-60].

van Oers [61], like Beach [62-64] and Engestrom [55-57], start from the premise that the process by which people acquire knowledge or skills cannot be separated from the context in which they find themselves. If learning is decontextualized, there is little hope for transfer to occur. This school is also called the sociocultural tradition within contemporary learning theory. It offers a reconceptualization of transfer, arguing to use the term ‘ ‘transition’ ’ or ‘ ‘cross boundary learning’ ’, since it is people who move, not knowledge or learning. This contemporary stance toward transfer phenomena sees continuity and transformation in learning as an ongoing relation between changing individuals and changing social contexts [62]. Measuring transfer is by no means a simple undertaking as transfer is difficult to study and even more difficult to foster intentionally [62]. Even successful training or educational programs cannot guarantee that newly learned knowledge and skills will be transferred to the workplace [24]. Given the many factors to be considered in measuring transfer coupled with the lack of a widely accepted and standardized evaluation methodology, there currently does not seem to be a valid basis for generalizations about the overall transfer of training [65]. In the traditional view, transfer has been measured as the use or application of a specific skill that has been learned. Contemporary views on transfer measure it as an ongoing process influenced by and influencing the environment, rather than as a series of discrete acquisition events [40]. Clearly, these different ways of conceptualizing or capturing transfer have a significant effect on the relationships that are ultimately reported [66], as will become clear in the following paragraphs.

### **3.2.2. Capturing transfer**

Over the past decades of research on transfer, many factors have been shown to influence the process of transfer. From the 1960s to the late 1980s, the contributions of Baldwin and Ford [67] focused on a traditional model of transfer of training, highlighting trainee characteristics, training design and delivery, and work environment as the three primary domains influencing the process of transfer. Since then, substantial progress has been made by investigating each of these domains in greater detail. A review by Burke and Hutchins [68] gives an overview, by domain, of many of the variables that have been studied. From this review it can be concluded that strong or moderate relationships have been proven to exist for most of the variables within each of these three main domains (Fig. 2a-c), but more research is needed to clarify or confirm the findings since inconsistencies in the influence of factors still remain to be clarified [68].

These inconsistencies have led Blume et al. [66] to undertake the first full-scale quantitative review of 89 empirical studies examining the influence of variables and moderator effects for each of the three main domains. This resulted in an overview of quantitative values. Little is known, however, about the interplay between these factors in specific contexts, since these factors were measured in isolation from the context or working environment in which they normally occur. Grossman and Salas

[69] therefore concluded that, although a wealth of information regarding the transfer of training has been uncovered by researchers, inconsistencies remain and organizations may find it difficult to pinpoint exactly which factors are critical when they consider applying the findings in their own context. Researchers should therefore shift their attention away from measuring isolated factors toward measuring factors within specific working contexts or conditions [66,69]. Even within the field of workplace learning most models of work experience have either ignored the influence of context upon learning or approached this issue mechanically [59,60]. Or as Hager and Hodkinson [40] put it, since skillful practice is both holistic and significantly contextual rather than atomistic and context-free, measuring transfer decoupled from context, does not make much sense. Van Oers even argued that the concept of context still remains ill-defined in literature and should be conceived of more dynamically [61]. In other words, the traditional approach and its resulting insights have significantly advanced research in the field, but appear somehow limited in their possibility to explain existing inconsistencies. This invites researchers to complement existing research outcomes and add more constructivist, contextual perspectives to investigate the issue at hand.

[FIGURE 2]

### **3.2.3. Qualitative system-oriented research**

So far, the use of qualitative methods in transfer research has been limited [70], especially in the traditional school of research on transfer. Cromwell and Kolb [71] discussed how qualitative approaches can be useful for generating more information about the systemic nature of transfer processes. If we are to understand more of the underlying mechanisms influencing transfer, it would be helpful to design research in which qualitative methods are used as a first step. Pope et al. [72] explored some of the qualitative methods that can be used to gather such information. As stipulated by Grol et al. [45], studying the effects of specific interventions in controlled trials will provide some answers to some questions about effective interventions and change, but will not address some of the basic questions about the critical success factors. In order to do so, existing studies will have to be complemented by more constructivist, observational and system-oriented qualitative studies [44,46,47,73].

### **3.2.4. Workplace learning and multilevel transfer models**

At the same time as research on transfer of training has continued, there has been a rise in interest in new schools of thought specifically aiming at learning at work. This recent emphasis on ‘workplace learning’ suggests that conventional training transfer research may be inadequate to understand the dynamics of performance improvement through training. Cheng et al. suggest however that, rather than the replacement of transfer by workplace learning, training transfer issues still need to be solved. No matter how knowledge (or ‘learning outcomes’) is acquired (whether through the workplace or not), it needs to be transferred to the job, within a job or from one job to another [24,74,75].

The workplace is a type of learning environment well recognized and emphasized by contemporary researchers to bring new perspectives to research on learning [59,74,75], but underresearched in traditional models [76]. In workplace learning, learning is more informal in nature (in contrast to formal learning by training). Since much of this type of learning is invisible, tacit or occurring without awareness, it is a

challenging process to research in relation to transfer. Eraut [77] has defined transfer in this regard as five interrelated stages: extraction of knowledge from the context, understanding the new situation, recognizing what knowledge and skills are relevant, transforming them to fit the new situation, and integrating them with other knowledge and skills in order to act in the new situation. This whole process is much more complicated than just desituating and resituating a piece of knowledge and the fourth and fifth stage are often ignored in research. The fifth stage in this transfer process draws attention to the holistic nature of performance in most workplaces. Evans [74,75] confirmed that naïve mapping of key skills between environments does not work. In addition, skills gained from various life experiences (such as travel and bringing up children) are a central part of a person's learning process, mutually interacting with and changing the environment in which they are deployed, but often ignored by researchers.

In order to capture these multiple factors influencing learning and transfer in the workplace, such processes should be studied from a more contemporary, multilevel (rather than a linear) perspective, meaning that contextual influences should be investigated [68]. Most existing traditional models on transfer use a linear perspective in which the influence of the context is not directly included.

As a first example of a contemporary multilevel approach, Guile et al. present a model that embodies the concept of connectivity as a basis for a productive and useful relationship between formal and informal learning and transfer at the workplace [59].

A second example of a multilevel approach to transfer is Holton's transfer model and related instrument, the learning transfer system inventory (LTSI) [78]. Holton [25,78-80] describes transfer as a function of a system of influences, stating that transfer can only be completely understood and influenced by examining the entire system. Holton and Bates [79] contended that most studies have stopped at the point of identifying, describing, or measuring factors that may influence transfer, without proceeding to investigate how those factors might be effectively changed or managed. Holton et al. brought this research a bit further by building an action-oriented approach to transfer intervention based on the LTSI. This helps to explore ways to change and manage effectively the factors influencing transfer processes [24].

A third example of a contemporary multilevel approach is called activity theory. This theory states that a systems view of the organization alone is insufficient if one truly wants to understand and facilitate learning and change, since change must be initiated and nurtured at the individual level by real identifiable people and groups [57]. Activity theory is a framework aimed at transcending this dichotomy between micro level (individual) learning processes and macro level (organizational) structures.

A fourth and final example of a multilevel approach to learning and transfer is developed by Mezirow [81] and called transformative learning theory. Key to the process of learning here is that the learner has to recognize narrow frames of references within him or herself through a disorientating experience thereby problematizing current attitudes, values and beliefs. This confronting experience creates new frames of references within the person. Since these new frames of

reference are a way of personalized, deep level learning, they are transferred more easily across boundaries [73,81-83].

More research is needed to test these existing multilevel models and approaches in specific contexts, such as the medical environment in which clinicians operate.

#### **4. DISCUSSION AND CONCLUSION**

##### **4.1. Discussion**

Most studies on effectiveness and transfer of medical communication skills examine the extent to which communication skills - learned off the job - are transferred to the clinical workplace. This way of looking at learning and transfer fits more the traditional view of learning. This view may not be sufficient to understand the mechanisms underlying the learning and transition of communication skills for clinicians. A broader, more contemporary view on learning and transfer views effectiveness of communication skills training as a continuing change and transition in both the learner and its environment, instead of mere acquisition of predefined skills that are transferred from training to workplace. This contemporary view may fit better when dealing with such tacit skills as communication skills, since they cannot and should not be atomized, as seen in Section 3.1.2.

In addition, the influence of the medical context (defined as the working environment in which clinicians have to learn, transfer and integrate communication skills) may also have to be taken more into account when examining the effectiveness of communication training programs. By focusing on the whole system, a more complete or accurate view can be obtained. This may be especially relevant for communication skills learning in medical environments, since in most hospitals the learning of communication skills through informal processes of socialization and role modeling is dominant over formal learning by training. These are important contextual factors to take into account and to investigate in more detail.

Fig. 3 gives an overview of the findings in light of our two research questions and possible remedies.

This review has been limited to publications in the English language and one Dutch publication. Moreover, findings from reviews are vulnerable to interpretation bias. In this narrative review we have reduced the risk of interpretation bias by using an open to closed inclusion strategy and by discussing all research findings, conclusions and recommendations with four experts and all co-authors in an iterative procedure until consensus was reached.

##### **4.2. Conclusion**

From our review we conclude that existing gaps in the literature on effectiveness of communication skills training can be explained or understood better if we look at insights from theories on transfer and learning. The existence of different views on and examination of transfer and learning may explain why findings of current studies are not conclusive or inconsistent. A broader view in which the learning and measurement of communication skills is interpreted in the light of contemporary, constructive theories seems to be a promising way forward and of added value to existing research. Pursuing this line of inquiry is challenging and worth investigating to provide more pieces to complete the puzzle of transfer (transition) of communication skills training in the medical domain.

### 4.3. Practice implications

We suggest that future research should focus on investigating which of the constructivist multilevel approaches to learning and transfer, as presented in this review, can best be used in a medical context to increase our insight into the mechanisms that (fail to) promote transition and integration of communication skills training.

#### [FIGURE 3]

#### Conflict of interest

The authors have no conflict of interest.

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**FIGURES:**

figure 1. Kirkpatrick's four levels of evaluation

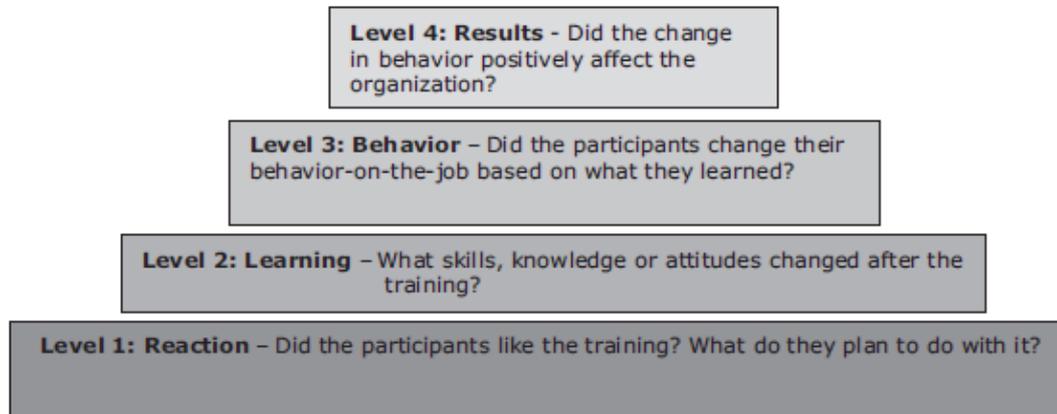


Fig. 2. (a) Summary of the trainee characteristics - transfer link (Burke and Hutchins [68]). (b) Summary of the training design and delivery - transfer link (Burke and Hutchins [68]). (c) Summary of the work environment - transfer link (Burke and Hutchins [68]).

a

<i>Variable</i>	<i>Strong or Moderate relationship with transfer</i>	<i>Mixed Support</i>	<i>Minimal empirical research exists</i>	<i>Research is needed to clarify or to build findings</i>
Cognitive ability	✓			
Self-efficacy	✓			
Pretraining motivation	✓			
Motivation to learn			⊗	○
Motivation to transfer			⊗	○
Extrinsic vs. intrinsic motivation		❖		○
Anxiety/ Negative affectivity	✓			
Conscientiousness		❖		○
Openness to experience	✓			○
Extroversion			⊗	○
Perceived utility	✓			
Career planning	✓			
Organizational commitment	✓			
External vs. internal locus of control		❖		○

b

<i>Variable</i>	<i>Strong or Moderate relationship with transfer</i>	<i>Mixed Support</i>	<i>Minimal empirical research exists</i>	<i>Research is needed to clarify or to build findings</i>
Needs analysis			⊗	○
Learning goals	✓			
Content relevance	✓			
Practice & feedback	✓			
Over-learning				○
Cognitive overload				○
Active learning			⊗	○
Behavioral modeling	✓			
Error-based examples	✓			○
Self-management strategies		❖		○
Technological support			⊗	○

C

<i>Variable</i>	<i>Strong or Moderate relationship with transfer</i>	<i>Mixed Support</i>	<i>Minimal empirical research exists</i>	<i>Research is needed to clarify or to build findings</i>
Strategic link			⚙	○
Transfer climate	✓			○
Supervisory support	✓	❖		○
Peer support	✓			
Opportunity to perform	✓			
Accountability			⚙	○

Figure 3. overview of results according to the two research questions and possible remedies

<i>Gaps in research on effectiveness of communication skills (CS) training</i>  <i>(R.Q.1)</i>	<i>Relevant insights from research on transfer and theories on learning to build a broader view and guide research in the field of medical communication skills</i>  <i>(R.Q.2)</i>	<i>Possible remedy</i>
1. -Inconsistency and variability in findings on effectiveness.  - No consensus on how to measure effectiveness.	1. Constructivist theories regard learning (of skills) as a continuous process of exchange between the learner and his environment (non-reductionistic approach), instead of regarding learning as acquiring and transferring atomized skills isolated from the context.	1. -Establish more consensus on defining and measuring effectiveness of CS training.  - Establish more accurate assessment methods that can be applied in daily practice.
2. Lack of context-related assessment of CS.	2. Measuring transfer decoupled from context, does not make much sense, since learning is shaped by and shaping the context in which it occurs.	2. Meet the need for context-specific estimates to better capture transfer relationships.
3. Need for more clarification research and conceptual models.	3. Contemporary schools encourage qualitative research to clarify and conceptualize underlying processes of learning and transfer, thereby incorporating the whole system.	3. Conduct more clarification research and gain insight in underlying mechanisms.
4. Lack of systematic implementation at organizational level.	4. Understanding which mechanisms influence transfer and implementation requires multilevel approaches instead of linear approaches. Examples of constructivist multilevel models include Guile's connectivity model, Holton's transfer model/ action approach, Engstrom's activity theory, and Mezirow's transformative learning theory.	4. Make the learning of CS a more integral part of the existing organisational climate by applying constructivist multilevel approaches to transfer and learning.
5. Lack of insight in which mechanisms or factors inhibit or facilitate physicians' implementation of CS in their daily practice.	5. Constructivist multilevel approaches should be tested in specific contexts.	5. Investigate which constructivist multilevel approach(es) can be used in a medical context to increase insight in which factors (fail to) produce learning and transfer of CS.