# Communication, Cognition and Competency Development in Healthcare: A Model for Integrating Cognitive Ethnography and Communication Skills Training in Clinical Interventions

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**ABSTRACT**

**OBJECTIVES:** The aim of this study was to conduct and evaluate the Blended Learning communication skills training program. The key objective was to investigate (i) how clinical intervention studies can be designed to include cognitive, organizational, and interactive processes, and (ii) how researchers and practitioners could work with integrated methods to support the desired change.

**METHODS:** The method combined design and implementation of a 12-week Blended Learning communication skills training program based on the Calgary-Cambridge Guide. The training was implemented in a patient clinic at a Danish university hospital and targeted all healthcare professionals at the clinic. Cognitive ethnography was used to document and evaluate healthcare professionals' implementation and individual competency development, and support the design of in-situ simulation training scenarios.

**RESULTS:** Thirteen participants completed the program. The synergy within the teams, as well as the opportunities for participants to coordinate, share, discuss, and reflect on the received knowledge with a colleague or on-site researcher, affected learning positively. The knowledge transfer process was affected by negative feedback loops, such as time shortages, issues with concept development and transfer, disjuncture between the expectations of participants and instructors of the overall course structure, as well as participant insecurity and a gradual loss of motivation and compliance.

**CONCLUSION:** We propose a novel 3-step model for clinical interventions based on our findings and literature review. This model will effectively support the implementation of educational interventions in health care by narrowing the theory-practice gap. It will also stimulate desired change in individual behavior and organizational culture over time. Furthermore, it will work for the benefit of the clinic and may be more suitable for the implementation of communication projects than, for example, randomized setups.

**KEYWORDS:** Clinical interventions, design and assessment of interventions, health communication, person-centered care, blended learning, cognitive ethnography, *in situ* simulation, Calgary Cambridge guide

## Introduction

In recent years, healthcare research has increasingly focused on factors such as the patient's involvement in treatment,[1] the patient-healthcare professional relationship,[2,3] the patient's attitude to treatment,[4,5] the importance of patients' existential and spiritual needs,[6–9] the anxiety of showing uncertainty and vulnerability, or anxiety to fail.[10–12] These changes in healthcare research were largely informed by phenomenological philosophy and the dialogical turn in patient-centered health communication.[13] Simultaneously, we have seen an increased recognition of the role of the non-technical (cognitive, relational, and personal) skills of the healthcare professionals (HCPs) on patient safety, effective delivery of care and quality in care.[14–18]

The most frequently used interventions to improve patient-centered care are training programs on patient-centered communication.[19–25] The crucial component of these programs is that they incorporate activities to promote the transfer of acquired skills into daily practice.[24,26] Existing research shows a positive effect of these training programs on HCPs' self-efficacy[27–31] and patient outcomes.[29,32–35,a] However, research regarding these programs often views the design and

implementation of interventions as 2 distinct processes; treating implementation activities as a series of problem-solving exercises.[36–38] These studies focus predominantly on the design of facilitatory interventions aimed at implementing change, and/or on measuring the "effectiveness" of the intervention by systematically relying on such measurable outcomes as HCPs' self-efficacy and patients' communication experience.[8–10,12,35,39,40] They pay little attention to the actual learning and knowledge transfer processes—that is, how the facilitatory interventions are absorbed and translated into clinical practice, what strategies are used, what works well, and what are the challenges. Thus, they largely ignore the fact that learning, like problem-solving and clinical reasoning,[41] is both an individual (embodied and enacted) process *and* something embedded in organizations, norms, and procedures.[42–45]

Although valuable, these methods cannot reflect the embodied learning and knowledge transfer practice in real-time clinical settings. Yet, questions like: "*How and when do HCPs acquire new knowledge?*"; "*How do they translate and operationalize this knowledge and skills into their daily clinical practices?*"; "*How do organizational structure and local culture of care support or impede learning?*"; and "*What and who motivates HCPs to participate in the activities?,*" are vital if we want to secure effective implementation of interventions in a clinical setting. Asking these questions may help to minimize the risk of transfer loss. It may also nudge and sustain collective motivation,[46] promoting the desired change on individual and organizational levels. To ensure that an intervention is flexible enough to accommodate real-life clinical work environments, we need research that identifies and assesses contextual factors related to clinical interventions.[47]

The existing gap between clinical research-based knowledge and its implementation into clinical practice[48–50] may reflect the inadequacies of the traditional pathways for the research and implementation. These inadequacies include the lack of relevance of the published clinical trials to clinical practice, the lack of feedback and incentives for the use of evidence-based practices, the lack of adequate infrastructure and systems to support knowledge transference,[38,50,51] as well as the lack of managerial ability to timely resolve moments of ambiguity which might occur during the implementation.[52]

This brings forth a need for understanding the pragmatic interplay between the delivery of research knowledge, HCPs' assessments of their own skills (as well as their vision regarding what constitutes good patient communication), and their experiences with, and responsiveness to, interventions. In other words, we need to understand how HCPs make meaning of the implemented activities and how these activities are being embedded in an organizational context (ie, how they "fit in" into the mundane routines and work life of HCPs). With this study we aim to conduct and evaluate the Blended Learning communication training program. The objective is to investigate how clinical intervention studies can be designed to include cognitive, organizational, and communicative/interactive processes and how researchers and practitioners can work with integrated methods to support the desired change.

## Methods

### Design

The project was designed as a large-scale, single case study, conducted in collaboration with an outpatient clinic at a Danish university hospital. The objective was to ensure that the learning is relevant to the HCPs' everyday life, thereby reducing the risk of poor transferability. In close collaboration with the outpatient clinic's staff, we piloted the development and implementation of 'The Communication, Cognition and Competence Development in Health Care (3Co) project' between January 2020 and September 2021.

Acknowledging that effective public health care requires methodological pluralism,[53] the 3Co project was designed so that there was a close interplay between research methods derived from humanistic interaction research, cognitive science, health science communication and implementation research. During the first phase of the project period, the focus was on the development and implementation of the training program, and on ethnographic observation. The purpose was to understand everyday clinical practices of the HCPs and the organizational framework within which these practices are situated. Cognitive ethnography (CE) and systematic video recordings of patient consultations were then used to document the ongoing changes at the individual level, and to evaluate whether the intervention was flexible enough to accommodate a "real-time" clinical environment. This information was then used to develop a 3-step model for clinical interventions. The project was carried out solely in the Danish language.

### Recruitment

Initially, all the permanent medical staff at the outpatient clinic were enrolled in the training program—altogether 37 of the clinic's HCPs, including physicians, nurses, and medical secretaries. However, as the Covid-19 pandemic unfolded in the spring 2020, 40% of the clinic's employees were sent to work with the Covid-19 patients. Consequently, the number of participants was reduced. Eventually, 2 groups—with 7 and 6 participants in each group, respectively (altogether, 13 HCPs)—were able to complete the training program in the timespan allocated for the project. The clinic's management chose which HCPs participated in the program, with priority being given to those HCPs who expressed a wish to participate in the program. To create space for cross-disciplinary exchange and collaboration and secure that the study included the experiences and beliefs of diverse segments of the population within the outpatient clinic, an equal number of physicians, nurses, and medical secretaries were recruited to participate in the

study. Consequently, each group consisted of 2 physicians, 2 nurses, and 2 medical secretaries. Group one was then joined by the clinic's chief physician.

The sampling size relied on purposive sampling to support the case-oriented analysis fundamental for the study inquiry.[54] In purposive sampling, the sample size is justified based on the selection of participants who are likely to produce information-rich cases that will illuminate the questions under study.[54–56] We believe that the specific selection of the participants who found an interest in this study supports this need for information-rich cases relating to the aim of the study. The sampling also enables the capturing of diverse individual experiences with the program and learning strategies among different professional groups in the outpatient clinic. The power analysis was not performed for this study since it was a qualitative study. However, we argue that saturation has been researched based on the data from 13 participants in the Blended Learning communication training program and 133 video-recorded observations of patient consultations, as further data collection is unlikely to produce new, valuable insights concerning the aim of this study. All the participants signed a written consent form prior to the intervention.

### The training program

The implemented training program was a Blended Learning communication training version of a 3-day communication course previously conducted at all clinical departments at Lillebælt Hospital.[30,31,57] The program builds on the Calgary-Cambridge Guide (CCG).[58] In CCG, a logical schema for the clinical encounter and description of the micro-skills required for communication training is provided through 5 basic tasks that providers and patients routinely need to accomplish: (1) initiating the session, (2) gathering information, (3) physical examination, (4) explanation and planning, and (5) closing the session.[58,59] In Blended Learning communication training, the most suitable methods, such as in-person teaching, e-learning, practical exercises, and skills training, are combined into a learning process to optimize learning.[60,61] The CCG Blended Learning communication training was therefore designed as a combination of e-learning modules, in-class in-person training, and individual supervision based on the participants' own video consultations. The program extended over a period of 12 weeks, and included the following modules:

Pre-Class: 5 e-learning modules over 5 weeks
Face-to-Face: Two 4½ hours in-class teaching sessions
Supervision: 2 h supervision session with the instructor, in dyads

The Pre-Class included 5 e-learning modules stretching over 5 weeks, including an introductory module explaining content and methods, and 4 modules built around the following parts

of the CCG model: (1) preparing the conversation and agreeing on a shared agenda, (2) gathering information with an emphasis on the patient perspective, (3) conveying information, and (4) ending the conversation including a clear joint plan. The e-learning modules were structured around short, instructional simulation videos, and accompanied by reflective exercises. After each e-learning module, the HCPs were given instructions for how to train the introduced skill(s) in the clinic. Since the e-learning modules were designed to be conducted individually by each participant at their convenience, no specific amount of time was allotted for the implementation of the modules. However, within the digital platform hosting the e-learning modules, it was possible to record whether the HCPs completed the modules and how long this took for them. Therefore, we could see whether the participant started the modules, which participants started the modules, whether the participant completed the module, and how long each participant used to complete the module. Within the digital platform, after the competition of each module, the participants were asked to evaluate how satisfied they were with the e-learning module (its structure, the time used, the insights it provided, etc) on a scale from 1 to 10.

The e-learning modules were followed by a Face-to-Face module consisting of 2 in-class sessions, each lasting 4½ hours. These modules covered an elaboration of the 4 CCG e-learning modules as well as training of communication skills. The in-class, in-person training was characterized by a learner-centered approach, organized around role-play, feedback and skills training exercises, and based on the HCPs own cases from the clinic.[61,62] To secure cross-disciplinary exchange, all HCPs in the program participated in the in-class training. After the in-class, the participants were offered a 2-h supervision session with the instructor. The supervision sessions focused on analysis and individual feedback of their own cases. They were conducted in dyads (separately for nurses, physicians, and medical secretaries), to accommodate the needs, and maximize the psychological safety, of each professional group. The in-class training sessions and the supervisions were video-recorded, and transcribed, to provide additional insights into participants' experiences and challenges with the program.

### Data collection—cognitive (video) ethnography

The CE method was used to document and evaluate the change in the HCPs' individual behavior and representations. It was also used to understand how learning strategies and challenges experienced by the participants during the intervention were related to their environment.[63–66] CE was developed to study cognitive processes in organizational contexts.[65–70] CE goes beyond the phenomenological approach to healthcare communication[b] and provides more systematic knowledge about real-life clinical practices, and opening a possibility to register, (a) how the receivers of the interventions perceive and animate

**Table 1.** The number of recorded patient consultation per HCP.

|  | PROFESSION | DURATION OF THE CONSULTATION | PRIOR TO INTERVENTION | DURING E-LEARNING INTERVENTION | AFTER FACE-TO FACE INTERVENTION/ SUPERVISION | TOTAL NUMBER OF CONSULTATIONS/PT. ENCOUNTERS |
|---|---|---|---|---|---|---|
| HCP 1 | Nurse | 40 min | 6 | 24 | 1 | 31 |
| HCP 2 | Physician | 20 min | 15 | 32 | 3 | 49 |
| HCP 3 | Nurse | 20 min (4 × 40 min) | 7 | 26 | 0 | 33[a] |
| HCP 4 | Physician | 20 min | 3 | 16 | 1 | 20 |
| HCP 5 | Physician | 20–30 min | 0 | 10 | 0 | 10 |

aSixteen of the patient consultations conducted by HCP3 were managed together with HCP2.

the learning tasks, objectives, and activities, to which they are being introduced, and (b) how sociocultural and situational factors and coordination within the team influence the learning process. CE is proven to be an effective way of studying distributed activity systems such as reading, games, communication models, simulations, and learning.[71,72] It is therefore also an apt methodology for the study of learning through interventions. It ensures that human activity—such as learning—can be regulated, adapted, and adjusted.[73–76] Such knowledge can then be used to provide evidence of convergent validity,[71,77] opening targeted and methodologically didactic possibilities for changing clinical practices, making them more effective and person-centered.

Methodologically, CE emphasizes observation and analysis of space, objects, concepts, actions, tools, rules, roles, and language as the key features in determining the organization, transfer, and representation of information.[63,71,78] These features can be made visible through video ethnography. In accordance with CE methodology, we followed the mundane communicative practices and learning of those nurses, physicians, and medical secretaries at the outpatient clinic who were exposed to a communication intervention program. We conducted daily ethnographic observations at the clinic (including participant observations during the intro course for medical professionals, medical conferences, morning briefings, nurses' weekly meetings, etc). We also systematically video-recorded patient consultations of all HCPs in group one over a period of 8 months. The objective was to identify and track changes in the registers and representations that the HCPs bring into coordination with the patients in the process of ensuring meaningful communication.[79] Video recordings allow us to systematically and repeatedly observe and investigate the change, as well as "the relevant processes of embodied meaning-making that lead to particular actions"[80(p159)]. To observe the change, we recorded patient consultations at 3 stages: before the intervention, during the implementation of e-learning modules, and

after the face-to-face intervention. Altogether, we have video-recorded 133 medical consultations, comprising of 70 h of video-recordings of authentic patient consultations, covering 16 different medical professionals (6 physicians and 10 nurses), and 12 different sets of medical teams. All video data were subsequently transcribed either in Microsoft Word or using the program InScribe, following the overall conventions for transcribing dialogues.[81] The number of recorded consultations per HCP, who participated in the program, is exhibited in Table 1.

We have also video-recorded secretaries' communication with the patients during their duty at the clinic (approx. 120 min for each secretary), to gain insight into their strategies and challenges. In addition, each HCPs participating in the training was asked to choose one video-recorded consultation for the supervision session, instead of using self-recorded videos.[24] The objective was to guarantee the HCPs' participatory involvement, minimize the program's demands and reduce the pressure related to the recording of self-tapes.

The videodata were supplemented by face-to-face informal conversations with the clinic's employees regarding their individual experiences with the program, all of which were systematically registered in the researcher's field notes (approx. a hundred pages). 3 interviews with HCP and 2 group conversations were audio-recorded and transcribed. We also interviewed the lead nurse and the course instructor to get their feedback on the program and gain insights beyond module evaluations from the digital platform. The ethnographic findings were used to provide evidence for our analytic assessment of interventions concerning how knowledge is appropriated and how time, events, material objects, and social relations are made relevant in an instance of knowledge transfer.[78] Note that initially, we also planned to conduct self-efficacy questionnaires, but it could not be effectuated because of strict measures implemented by the hospital due to the Covid-19 pandemic.

## Data analysis

In analyzing the ethnographic data, we rely on the phenomenological-hermeneutic tradition[82] and thematic analysis, used in traditional ethnography.[83,84] In the analysis of videodata we rely both on multimodal interaction analysis[81,85] and on cognitive event analysis (CEA) used in CE[86,87] to capture the real-time unfolding of events, as well as the changes and transitions that emerge around learning.[80] CEA is a qualitative and cognitive method for analyzing video recordings, particularly used for investigating how humans adapt to and modify their environment in order to get things done.[80,88,89] It focuses on how results are achieved—for example, how problems are solved or how decisions are made—allowing the investigation of "the relevant processes of embodied meaning making that lead to particular actions and outcomes in the system"[80(p159)]. The methodological procedure of CEA is described in Steffensen et al and Lebahn-Hadidi et al and consists of 5 steps spanning from event identification to interpretation.[87,89] In analyzing the video data, we looked more specifically at how the communication trajectory of the HCPs exposed to intervention changed over time. The purpose was to determine how and to what extent the HCPs applied the communicative skills introduced through e-learning modules in their clinical practice, and to identify any significant changes in the HCPs' behavior over time: What worked well, and what were the challenges. We paid attention to both verbal patterns and inter-bodily dynamics, including mutual monitoring and the reflexivity of embodied interaction[90(p3)] to see the different ways in which medical specialists learn, enact, and translate knowledge to practice.

## Results

Altogether, 13 participants completed the Blended Learning communication training program. During the implementation of the training program, we observed that face-to-face sessions with the facilitator make room for interdisciplinary participation. This approach has the potential to strengthen teamwork and collaboration between different professional groups. However, the integration of an e-learning platform into a busy everyday of HCPs also presented a series of challenges. These included a feeling of overload, "lack of time" to engage in the introduced learning activities, gaps in the conceptual framework, and gradual loss of motivation among the participants.

"Finding time" to complete e-modules was an issue voiced by the HCPs as a major challenge. Both the nurses and the physicians struggled to find time to complete the e-modules, due to "work overload." Their work at the clinic was structured according to a very tight time schedule with very little time (20 min) allotted to each patient. Yet, no time slot was allotted for the implementation of the e-learning modules in their work schedule. Therefore, they found it difficult to fit the e-learning communication training into their regular daily operations at the clinic. One of the participants admitted that she simply "clicked through the e-learning modules" on a Saturday night, because she could not find time in her busy work schedule to complete the training at the clinic. Another participant said that she needed to prioritize her daily routines at the clinic and had no time to complete the exercises. In another case, a participant approached the researcher working on-site and asked for a slot in her daily program for a prearranged meeting with the program organizers to assist her with completing it. According to the management team at the outpatient clinic, they too struggled with finding resources to keep the workflow at the clinic, when the clinicians needed to be "pulled out of the clinic" for the in-class or the supervision sessions. This placed additional pressure on the management team who needed "to make things work."

We also registered the gradual loss of motivation and decreasing compliance among the participants after the introduction of the third e-learning module (on the shared agenda). Only 3 of the participants (1 physician and the 2 medical secretaries) sustained their motivation: They found the program and the introduced simulation scenarios useful and relevant. Conversely, the motivation and compliance of the other participants, decreased after the introduction of the third module. These participants argued that the introduced model was "difficult to apply," and the content was "less relevant" and "not really useful" in the contexts of their own clinical practice for 3 reasons: (1) the limited time allotted for patient consultations (20 min per patient), (2) the nature of patient consultations at the clinic, and (3) the number of tasks they needed to accomplish within the allotted time frame.

They felt that the introduced scenario was "made-up" and "unreal" (Danish, *tænkt*); "a wishful scenario." Participants agreed that some of the communicative strategies were useful, but the model was "too ambitious," given the number of tasks they had to accomplish in the 20 min they had with a patient. One nurse explained: "*I can see the point, but it is not really useful for the outpatient clinic. There is no time to open Pandora's box because then, you get behind the schedule.*" Besides, with the continuously increasing pressure on the clinic to accomplish more in less time, the everyday labor at the clinic is about "*getting through the day's program,*" the nurse clarified. Others have pointed out that applying new techniques made the interaction with the patient feel "unnatural" and "awkward," and it was more time-consuming, and resulted in HCPs getting behind the schedule, and in higher stress levels. A single participant also felt that her attempts to incorporate the introduced techniques in clinical practice "*took time from the patient,*" as she had to split her attention between the patient and learning. Consequently, she switched back to the "usual" routines.

Two aspects affected participants' motivation and intensity of participation and learning positively. Firstly, the synergy within the individual professional dyads (or teams), and secondly, the individual participants' opportunity to coordinate

learning—that is, to continuously share, discuss, and reflect over the received knowledge with a colleague or with the on-site researcher. Hence, participants in 2 of the professional teams shared offices and had the opportunity to talk to each other and reflect on each other's progress and understanding of the introduced knowledge. One of the teams also received a "reminder" e-mail from the chief physician, which encouraged at least one of the participants to (re)engage with the program and complete the remaining e-learning modules. Participants in teams without similar opportunities to collaborate and who worked in different locations and had different tasks and functions within the clinic struggled most with understanding and applying the conceptual frame to their own clinical practice. In their attempt to make meaning of the introduced knowledge and skills, they—more frequently than others—used the on-site researcher for clarification, assistance, or simply to reflect on the introduced activities and knowledge. In fact, the enduring presence of an on-site researcher provided an additional level of intervention and knowledge scaffolding. It also helped mediate the relationship between the HCPs, the management, and the program instructors, while also timely addressing and minimizing difficulties and misunderstandings during the implementation.

Our video data do not indicate significant changes in the individual behavior of the HCPs over time. However, they show that the one physician who continuously sustained a positive attitude towards the program (i) systematically applied CCG techniques during patient consultations, (ii) was more direct in his communication and more efficient with respect to building structure and creating an overview, and (iii) had a higher compliance than his colleagues in terms of keeping the time-schedule. All of this could have contributed to his positive response to the program. He also had some knowledge of the CCG framework prior to the intervention, while other participants did not.

In fact, part of the problem with the implementation of the program was often attributed to a conceptual gap, caused by a disjuncture between the expectations of the participants and of the instructors and the structure of the program. More precisely, the participants were expected to acquire operational knowledge of the CCG through e-learning prior to the face-to-face in-class training in week 8. Yet, in group one, all participants but one reported struggling with understanding the conceptual frame of the CCG. Consequently, they also struggled with seeing the relevance of the newly introduced concepts for their own clinical practice, and how these can be applied successfully in real-time, real-life interaction with the patients at the outpatient clinic. The chief nurse also emphasized that the lack of understanding of the key concepts and techniques led to "a large waste of time" and caused HCPs to reduce their engagement with the program. According to the in-class feed-back report, received from the course facilitator, the participant's knowledge of the conceptual frame and how CCG techniques can be applied in clinical practice was very

limited prior to face-to-face intervention. Also, the participants tended to see "the patient's mistakes and personality" as the major problem, rather than focusing on one's own challenges and skills. This pointed toward the need to adjust the program on an ongoing basis. Therefore, when introducing the program to the second group, the first in-class was moved into week one of the Blended Learning communication training program. This allowed to meet the participants' expectations, secure conceptual understanding, and improve knowledge transfer.

## Discussion and synthesis
### Lessons learned

The findings from this study confirm and specify some of the main challenges with transferring newly acquired communication skills to clinical practice.[39,91] They confirm that the HCPs consider good and effective communication with the patients to be among the primary tasks of the medical ward. Despite this, a concern for meeting schedules and the increasing pressure on the HCPs to accomplish more tasks in less time, places a contradictory demand on both the HCPs and the organization. Previous studies have also shown that self-efficacy increases significantly after the educational course, but we also know that there is a decrease in self-efficacy after 6 months.[31,40,92] This highlights an increasing need for research that allows the investigation and implementation of elements that can contribute to the continuous adaption and maintenance of the intervention and of the acquired skills.[24,37,93]

There might also be a considerable variation in how the acquired skills are maintained in different departments. This partly depends on the support of the management and the facilitators' engagement and commitment, and partly on opportunities to work with communication (to try out and test the introduced communicative skills) in everyday clinical practice. As this study shows, the managerial support as well as synergy within the various medical teams affects learning. Our videodata additionally supports the claim that communication in medical teams, and their success or failure to accommodate patient needs effectively during the consultation, depends on collaboration within the team, their reciprocal trust over roles and procedures, and their joint abilities to experiment and 'think together' in a dialogue,[94,95] rather than exclusively on their individual skills. In other words, how HCPs co-acted and enacted their roles, responsibilities, and professional identities during the real-life, real-time consultation. Addressing the relational components and situational embedment of clinical interventions can therefore be crucial for optimizing knowledge transference and learning.

### Optimizing non-technical skills

So far, little attention has been paid to the relational components and situational embedment of clinical interventions

aimed at optimizing the medical practice of health professionals and their non-technical skills. Yet, as we see in our study, performance may drop drastically due to the employees' resentment or skepticism towards the strategic change initiative, or due to anxieties about their role, status, or identity within the organization.[96–98] When facing moments of ambiguity or uncertainty, the employees may also strive to clarify what is going on by extracting and interpreting cues from their environment and use these cues as a basis for a plausible account that provides order and "makes sense" of what has occurred, and through which they continue to enact in the environment.[52] As Stensaker and colleagues argue, even well-designed interventions may fail due to (at least in part) the micro-level processes, and particularly due to how change recipients make sense of change and shape the change outcome.[99–102] They argue that the process of implementation involves a sequence of actions including translation of strategic objectives into operational practices, mediation and negotiation among various organizational levels and groups, and the development and evaluation of tools to support and monitor activities.[102,103] Therefore, successful implementation of interventions requires an understanding of the micro-level meaning-making processes. It also requires consistency between facilitatory intentions and how these are translated and absorbed into operational level.[102]

Evidence derived from experimental studies of learning additionally suggests that learning is an embodied activity that is affected by multiple factors "spanning cognitive-emotional aspects (fatigue, hunger, lack of motivation),[104] external properties of the study environment (light, sound, ventilation, artifacts)[105,106] and embodied socio-historical aspects (movement and social and experiential background[107–109]" (Trasmundi, personal communication 11.06.2020). Application of similar techniques in different clinical situations may bring forth different responses from the participants and can produce dissimilar dialogical outcomes, as people dynamically respond to situatedness.[74,110,111] To understand learning, we then need to understand how "cognitive outcomes link rapid processes to the lived experience of action (roughly "sensemaking"; Weick 1995) and how macro processes are enabled and constrained by ongoing activity."[112]

### Strength and limitation

Within the framework of healthcare intervention research, CE opens a possibility for investigating challenges and opportunities that exist in a specific clinical setting in which learning is taking place. It allows us to register how the introduced knowledge and skills are acquired, absorbed, and translated into clinical practice of the learners, and how people dynamically respond to the situatedness: which strategies are employed and what are the challenges. It also permits us to scrutinize how situated action, preference formations, and rational

choice[113] are related to the broader organizational and socio-cultural context. In clinical environments, as this study shows, the embedded institutional and organizational forces influence the HCPs' thinking, perceptions, and reasoning, narrowing their options and shaping their preferences—that is, what individuals consider as rational, useful, appropriate, and/or important at a given moment. These forces provide a profound value-laden field of possible actions[114] and limit the transformative space for learning. For instance, a concern for meeting schedules places a demand on the organization and HCPs in real time that contradicts the major concern of person-centered patient care, namely, a concern for the patient and patient safety. This frames the participants' interpretations, feelings, and compliance with the intervention.

Application of ethnographic methods allows course facilitators to assess psychological and organizational challenges that incessantly arise during intervention (and unforeseen events like, eg, Covid-19 pandemic). Assessing these challenges may help resolve ambiguities that arise in the process. It may also help timely adapt facilitatory interventions to the learners' individual needs, securing their participation in the program. Most crucially, it allows us to work in a learning-oriented manner by observing and developing practices based on real, observed issues that practitioners are not immediately phenomenologically aware of *in situ*.[115] A concrete result based on this method is that the material and practical design of the clinical intervention studies can be continuously evaluated and reorganized to create the best conditions for a functional and efficient embedded learning practice. After all, to paraphrase anthropologist Lucy Suchman,[116] if we want to build educational programs for the people, we should watch them using them. With its focus on distributed cognitive systems, CE enables us to do that, revealing factors that may hinder or promote the optimized performance and task-solving.[115]

The major limitation of our research and intervention model is that it is time-consuming, and relies heavily on researchers' interpretation of the data, which can be subject to biases.[84,117] Also, CE often involves analyzing qualitative data (eg, field notes, interviews, conversation strategies, etc) and quantitative data (eg, response times, error rates).[72] Integrating these different types of data—as well as capturing and understanding cognitive processes, such as learning—can be challenging and requires careful consideration of synthesizing and interpreting findings from different sources.[63] Using interdisciplinary research teams and verification of the data by other means—for example, integrating patient perspective through application of CAT questionnaires and Nationwide Patient Satisfaction Surveys (LUP) to measure the change in patient satisfaction—could be used as complementary tools to secure reliability and validity of the data.[84] Quantitative measures can function as markers of change that provide an objective measure to direct the qualitative focus.[118] When used with quantitative methods, the qualitative investigation
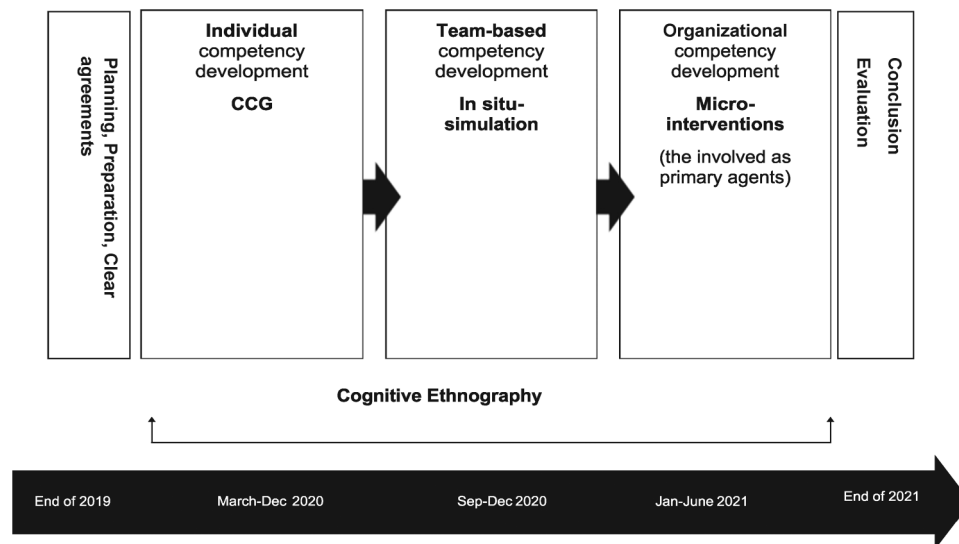
**Figure 1.** Intervention model.

further enables in-depth interpretation of complex dynamics of intervention and learning in health care.[119] The importance of procedure biases and cognitive strategies could also be profitably discussed in the preparation of educational programs.[72]

### Proposing 3-step model

To address these challenges, we propose a 3-step model for future competency development of the HCPs with interventions that can benefit knowledge transfer to clinical practice. The model is illustrated in Figure 1. In addition to the CCG Blended Learning communication training, which targeted individual competency development, the model includes team-based *in situ* simulation training performed in the complex clinical practice to support team-based competence development.[120–124] By adding team-based competency development in the second phase, the ethnographic knowledge can be used to support the development of simulation scenarios and micro-interventions. It can be smaller-scale interventions in daily activities, where researchers collaborate with clinicians to adjust processes and systems. In health care, simulation is increasingly used to train both individuals and teams in technical and non-technical skills (eg, situational awareness).[125–128] It is also applied to evaluate organizations and competencies and identify latent complaints and conditions predisposing to errors.[129]

Transfer of learning in technical skills from simulation training into the subsequent clinical practice is well documented.[130,131] As a training method, in situ simulation allows teams to review and strengthen their clinical problem-solving skills in preparation for a crisis or rare serious emergency.[129] Andersen and colleagues point out that skills training on advanced technical simulators develops competencies among the HCPs that allow for patient treatment to begin higher up on the learning curve.[132] This means that the number of

typical "beginner's errors" in treating the patient is reduced. ISS has been shown to positively affect HCPs' responses, changes in safety understanding, organizational performance, and teamwork. Mastering skill processes through various forms of simulation training improves surgeons' and other HCPs' performances.[133–135] The theoretical basis for *in situ* simulation is further supported by intervention system engineering, which suggests that *in situ* simulation can provide information about both the impeding and promoting factors that influence the 5 coherent elements of the work environment that affect patient care processes and outcomes: person, tools/technology, tasks, physical environment, and organizational characteristics.[136–138] This technique can therefore also be used to test changes, planned infrastructure or interventions.[139]

The third phase in our model focuses on continuous competency development and improvement of collective skills, knowledge, and the capacities of the entire organization (ie, organizational competency development). It suggests complementary interventions in the cognitive processes (problem-solving, decision-making, planning, team coordination) to promote an appropriate organizational practice concerning the competence development of patient-centered communication.

### Conclusion

The proposed model creates a unique foundation for clinically accommodated collaborations that may pave the way for the research-based development of the HCPs' communicative, relational, and cognitive competencies. A cross-disciplinary focus on interpersonal and organizational aspects of clinical practice is provided through a research agenda that supports participation and behavioral habit forming in support of person-centered patient care—through the integration of CE

and *in situ* simulation with more traditional healthcare intervention methods. Therefore, the proposed design is stronger to meet operational challenges occurring during clinical interventions than, for example, the randomized controlled trials. It enables a methodologically sound, in-depth interpretation of evidence-based practices and complex learning dynamics. It also allows for proper reporting and evaluation of interventions, as well as for an assessment of whether these are flexible enough to accommodate in real-time. Furthermore, by emphasizing the human aspects of treatment, the proposed model has also the potential to generate a positive culture change, an optimized organization, and better and more efficient patient care. It yields practical advantages for HCPs and can be foundational in scaffolding better-informed development and implementation of interventions. It can also pave the way for organizing and designing environments where decisions must be made and tasks must be solved, as well as for optimal training of practitioners in a clinical setting. We hope that initiatives of this kind will further the development and implementation of integrated intervention programs at hospitals.

## Abbreviations

| | |
|---|---|
| 3CoD | communication, cognition and competency development |
| CAT | communication assessment tool |
| CCG | Calgary-Cambridge Guide |
| CE | cognitive ethnography |
| CFPK | center for research in patient communication |
| HCP | healthcare professionals |
| OUH | Odense University Hospital |
| SDU | University of Southern Denmark |

## Author contributions
DS developed analytical argument, wrote the paper, and collected the data. JA and SVS designed the study and the study protocol. CT and TG wrote the part on the Blended Learning Program and provided the figure. JA and and DS prepared the revised version of the article. All authors contributed to the article and approved the submitted version.

## Availability of data and materials
The data that support the findings of this study are available from the Centre for Patient Communication, University of Southern Denmark, but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the University of Southern Denmark.

## Consent
Written informed consent was obtained from all participants in the study.

## Ethics
Ethical review and approval from the Legal Service, Research & Innovation Organization (RIO) at University of Southern Denmark were acquired for the study in accordance with the local legislation and institutional requirements (reference number: 10.855).

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## Notes
1. The most effective training programs are characterized by a "learner"-centered approach and a focus on active practicing of skills over a prolonged period—for example, by a means of role-play, feedback, and group discussions.[53,61]
2. The phenomenological approach to healthcare communication focuses on the investigation of patients and healthcare providers' subjective experiences (often before and after interventions). CE makes room for the complexity inherent in learning and in implementation of interventions.

## REFERENCES

1. Barrett B, Müller D, Rakel D, Rabago D, Marchand L, Scheder JC. Placebo, meaning, and health. *Perspect Biol Med*. 2006;49(2):178-198. doi:10.1353/pbm.2006.0019
2. Kelley JM, Kraft-Todd G, Schapira L, Kossowsky J, Riess H. The influence of the patient-clinician relationship on healthcare outcomes: a systematic review and meta-analysis of randomized controlled trials. *PLoS One*. 2014;9(4):e94207–e94207. doi:10.1371/journal.pone.0094207
3. Rakel D, Barrett B, Zhang Z, et al. Perception of empathy in the therapeutic encounter: effects on the common cold. *Patient Educ Couns*. 2011;85(3):390–397. doi:10.1016/j.pec.2011.01.009
4. Hyland ME, Geraghty AWA, Joy OET, Turner SI. Spirituality predicts outcome independently of expectancy following flower essence self-treatment. *J Psychosom Res*. 2006;60(1):53-58. doi:10.1016/j.jpsychores.2005.06.073
5. Price D, Finnis DG, Benedetti F. A comprehensive review of the placebo effect: recent advances and current thought. *Annu Rev Psychol*. 2008;59(1):565-590. doi:10.1146/annurev.psych.59.113006.095941
6. Hvidt NC, Hvidtjørn D, Christensen K, Nielsen JB, Søndergaard J. Faith moves mountains—mountains move faith: two opposite epidemiological forces in research on religion and health. *J Relig Health*. 2017;56(1):294-304. doi:10.1007/s10943-016-0300-1
7. Hvidt NC, Ammentorp J, Clemensen J, Steenfeldt VØ, Moestrup L, Søndergaard J. Eksistentiel og åndelig omsorg i Danmark. *Klin Sygepleje*. 2018;32(4):265-280. doi:10.18261/issn.1903-2285-2018-04-03
8. Hvidt NC, Nielsen KT, Kørup AK, et al. What is spiritual care? Professional perspectives on the concept of spiritual care identified through group concept mapping. *BMJ Open*. 2020;10(12):e042142-e042142. doi:10.1136/bmjopen-2020-042142
9. Baker LR, Martimianakis MAT, Nasirzadeh Y, et al. Compassionate care in the age of evidence-based practice: a critical discourse analysis in the context of chronic pain care. *Acad Med*. 2018;93(12):1841-1849. doi:10.1097/ACM.0000000000002373

10. Gulbrandsen P, Clayman ML, Beach MC, et al. Shared decision-making as an existential journey: aiming for restored autonomous capacity. *Patient Educ Couns*. 2016;99(9):1505-1510. doi:10.1016/j.pec.2016.07.014

11. Assing Hvidt E, Søndergaard J, Ammentorp J, et al. The existential dimension in general practice: identifying understandings and experiences of general practitioners in Denmark. *Scand J Prim Health Care*. 2016;34(4):385-393. doi:10.1080/02813432.2016.1249064

12. Assing Hvidt E, Søndergaard J, Hansen DG, et al. "We are the barriers": danish general practitioners' interpretations of why the existential and spiritual dimensions are neglected in patient care. *Commun Med*. 2018;14(2):108-120. doi:10.1558/cam.32147

13. Gillespie A. Review: the dialogical turn: turning the corner? *Theory Psychol*. 2010;20(3):461-463. doi:10.1177/0959354310364279

14. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human : Building a Safer Health System* (Kohn LT, Corrigan JM, Donaldson MS, eds.). National Academy Press; 2000.

15. Amalberti R. Human error at the centre of the debate on safety. In: *Navigating Safety*. SpringerBriefs in Applied Sciences and Technology. Springer Netherlands; 2013:19-52. doi:10.1007/978-94-007-6549-8_2

16. Sevdalis N. (PDF) Non-technical skills and the future of teamwork in healthcare settings. Published 2013. Accessed December 8, 2021. https://www.researchgate.net/publication/264622634_Non-technical_skills_and_the_future_of_teamwork_in_healthcare_settings

17. Agha RA, Fowler AJ, Sevdalis N. The role of non-technical skills in surgery. *Ann Med Surg*. 2015;4(4):422-427. doi:10.1016/j.amsu.2015.10.006

18. Reason J. Understanding adverse events: human factors. *Qual Health Care*. 1995;4(2):80-89. doi:10.1136/qshc.4.2.80

19. Dwamena F, Holmes-Rovner M, Gaulden CM, et al. Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Lib*. 2013;2013(12):CD003267-CD003267. doi:10.1002/14651858.CD003267.pub2

20. Poitras ME, Maltais ME, Bestard-Denommé L, Stewart M, Fortin M. What are the effective elements in patient-centered and multimorbidity care? A scoping review. *BMC Health Serv Res*. 2018;18(1):446-446. doi:10.1186/s12913-018-3213-8

21. Gregersen TA, Birkelund R, Wolderslund M, Netsey-Afedo ML, Steffensen KD, Ammentorp J. What matters in clinical trial decision-making: a systematic review of interviews exploring cancer patients' experiences. *Scand J Caring Sci*. 2019;33(2):266-278. doi:10.1111/scs.12637

22. Moore PM, Rivera S, Bravo-Soto GA, Olivares C, Lawrie TA, Moore PM. Communication skills training for healthcare professionals working with people who have cancer. *Cochrane Lib*. 2018;2018(7):CD003751-CD003751. doi:10.1002/14651858.CD003751.pub4

23. Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database Syst Rev*. 2012;(4):CD006560-CD006560. doi:10.1002/14651858.CD006560.pub2

24. Ammentorp J, Bigi S, Silverman J, et al. Upscaling communication skills training – lessons learned from international initiatives. *Patient Educ Couns*. 2021;104(2):352-359. doi:10.1016/j.pec.2020.08.028

25. Timmermann C, Prinds C, Ammentorp J, Larsen H. Relationer i Sundhedsvæsenet – hvorfor og hvordan? In: Hvidt EA, Søndergaard J, Grønning A, eds. *Relationer i Sundhedsvæsenet: Hvorfor Og Hvordan?* Samfundslitteraturen; 2021:191-208.

26. Uitterhoeve RJ, Bensing JM, GrolL RP, Demulder PHM, Van Achterberg T. The effect of communication skills training on patient outcomes in cancer care: a systematic review of the literature. *Eur J Cancer Care (Engl)*. 2010;19(4):442-457. doi:10.1111/j.1365-2354.2009.01082.x

27. Beck RS, Daughtridge R, Sloane PD. Physician-patient communication in the primary care office: a systematic review. *J Am Board Fam Pract*. 2002;15(1):25-38.

28. Fellowes D, Wilkinson S, Moore P. Communication skills training for health care professionals working with cancer patients, their families and/or carers. *Cochrane Database Syst Rev*. 2004;(2):CD003751. doi:10.1002/14651858.CD003751.pub2

29. Hulsman RL, Ros WJG, Winnubst JAM, Bensing J. Teaching clinically experienced physicians communication skills. A review of evaluation studies. *Med Educ*. 1999;33(9):655-668. doi: 10.1046/j.1365-2923.1999.00519.x

30. Ammentorp J, Graugaard LT, Lau ME, Andersen TP, Waidtløw K, Kofoed PE. Mandatory communication training of all employees with patient contact. *Patient Educ Couns*. 2014;95(3):429-432. doi:10.1016/j.pec.2014.03.005

31. Wolderslund M, Kofoed PE, Ammentorp J. The effectiveness of a person-centred communication skills training programme for the health care professionals of a large hospital in Denmark. *Patient Educ Couns*. 2021;104(6):1423-1430. doi:10.1016/j.pec.2020.11.018

32. Clark NM, Gong M, Schork MA, et al. Impact of education for physicians on patient outcomes. *Pediatrics (Evanston)*. 1998;101(5):831-836. doi:10.1542/peds.101.5.831

33. Evans BJ, Stanley RO, Burrows GD. Communication skills training and patients' satisfaction. *Health Commun*. 1992;4(2):155-170. doi:10.1207/s15327027hc0402_5

34. Roter DL, Hall JA, Merisca R, Nordstrom B, Cretin D, Svarstad B. Effectiveness of interventions to improve patient compliance: a meta-analysis. *Med Care*. 1998;36(8):1138-1161. doi:10.1097/00005650-199808000-00004

35. Ammentorp J, Kofoed PE, Laulund LW. Impact of communication skills training on parents perceptions of care: intervention study. *J Adv Nurs*. 2011;67(2):394-400. doi:10.1111/j.1365-2648.2010.05475.x

36. Greenwald P, Cullen JW. The new emphasis in cancer control. *J Natl Cancer Inst*. 1985;74(3):543-551. doi:10.1093/jnci/74.3.543

37. Glasgow RE, Lichtenstein E, Marcus AC. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. *Am J Public Health (1971)*. 2003;93(8):1261-1267. doi:10.2105/AJPH.93.8.1261

38. Ammentorp J, Kofoed PE. Research in communication skills training translated into practice in a large organization: a proactive use of the RE-AIM framework. *Patient Educ Couns*. 2011;82(3):482-487. doi:10.1016/j.pec.2011.01.002

39. Ammentorp J, Chiswell M, Martin P. Translating knowledge into practice for communication skills training for health care professionals. *Patient Educ Couns*. 2022;105(11):3334-3338. doi:10.1016/j.pec.2022.08.004

40. Ammentorp J, Sabroe S, Kofoed PE, Mainz J. The effect of training in communication skills on medical doctors' and nurses' self-efficacy. A randomized controlled trial. *Patient Educ Couns*. 2007;66(3):270-277. doi:10.1016/j.pec.2006.12.012

41. Gallagher S, Payne H. The role of embodiment and intersubjectivity in clinical reasoning. *Body Mov Dance Psychother*. 2015;10(1):68-78. doi:10.1080/17432979.2014.980320

42. Gallagher S. *Embodied and Socially Embedded Learning* (Gallagher Shaun, ed.). Network for Non-Scholastic Learning, NNL; 1999.

43. Illeris K. Workplace learning and learning theory. *J Workplace Learn*. 2003;15(4):167-178. doi:10.1108/13665620310474615

44. Stetsenko A. *The Transformative Mind: Expanding Vygotsky's Approach to Development and Education*. Cambridge University Press; 2017.

45. Vygotsky LS. Play and its role in the mental development of the child. *Int Res Early Child Educ*. 2016;7(2):3.

46. Dunbar M, Helms SE, Brodell RT. Reducing cognitive errors in dermatology: can anything be done? *J Am Acad Dermatol*. 2013;69(5):810-813. doi:10.1016/j.jaad.2013.07.008

47. Street RL, Makoul G, Arora NK, Epstein RM. How does communication heal? Pathways linking clinician–patient communication to health outcomes. *Patient Educ Couns*. 2009;74(3):295-301. doi:10.1016/j.pec.2008.11.015

48. Glasgow RE, Bull SS, Gillette C, Klesges LM, Dzewaltowski DA. Behavior change intervention research in healthcare settings. *Am J Prev Med*. 2002;23(1):62-69. doi:10.1016/S0749-3797(02)00437-3

49. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635-2645. doi:10.1056/NEJMsa022615

50. Tunis SR, Stryer DB, Clancy CM. Practical clinical trials: increasing the value of clinical research for decision making in clinical and health policy. *JAMA*. 2003;290(12):1624-1632. doi:10.1001/jama.290.12.1624

51. Glasgow RE, Magid DJ, Beck A, Ritzwoller D, Estabrooks PA. Practical clinical trials for translating research to practice: design and measurement recommendations. *Med Care*. 2005;43(6):551-557. doi:10.1097/01.mlr.0000163645.41407.09

52. Maitlis S, Christianson M. Sensemaking in organizations: taking stock and moving forward. *Acad Manag Ann*. 2014;8(1):57-125. doi:10.1080/19416520.2014.873177

53. Ammentorp J, Wolderslund M, Timmermann C, et al. How participatory action research changed our view of the challenges of shared decision-making training. *Patient Educ Couns*. 2018;101(4):639-646. doi:10.1016/j.pec.2017.11.002

54. van Rijnsoever F. (I can't get no) saturation: a simulation and guidelines for sample sizes in qualitative research. In: *Academy of Management Annual Meeting Proceedings*. Vol. 2016. 2016:12040. doi:10.5465/ambpp.2016.12040abstract

55. Patton MQ. *Qualitative Research & Evaluation Methods : Integrating Theory and Practice*. 4th ed. (Patton MQuinn, Patton MQ, eds.). Sage Publications, Inc.; 2015.

56. Luborsky MR, Rubinstein RL. Sampling in qualitative research. *Res Aging*. 1995;17(1):89-113. doi:10.1177/0164027595171005

57. Iversen ED. *Communication Skills Training at Lillebaelt Hospital, Denmark Evaluation of "Clear-Cut Communication with Patients"*. PhD thesis; 2020 June.

58. Silverman J, Kurtz S, Draper J. *Skills for Communicating with Patients*. Taylor & Francis Group; 2013.

59. Ammentorp J. *Den gode patientsamtale*. 1. udgave (Ammentorp J, ed.). Munksgaard; 2016.

60. Stuij SM, Labrie NHM, van Dulmen S, et al. Developing a digital communication training tool on information-provision in oncology: uncovering learning needs and training preferences. *BMC Med Educ*. 2018;18(1):220-220. doi:10.1186/s12909-018-1308-x

61. Berkhof M, van Rijssen HJ, Schellart AJM, Anema JR, van der Beek AJ. Effective training strategies for teaching communication skills to physicians: an overview of systematic reviews. *Patient Educ Couns*. 2011;84(2):152-162. doi:10.1016/j.pec.2010.06.010

62. Kurtz S, Silverman J, Draper J, Dalen JV, Platt FW. *Teaching and Learning Communication Skills in Medicine*. 1st ed. CRC Press; 2005. doi:10.1201/9781315378398

63. Ball LJ, Ormerod TC. Putting ethnography to work: the case for a cognitive ethnography of design. *Int J Hum Comput Stud*. 2000;53(1):147-168. doi:10.1006/ijhc.2000.0372

64. Goodwin C. Professional vision. *Am Anthropol*. 1994;96(3):606-633. doi:10.1525/aa.1994.96.3.02a00100

65. Hutchins E. How a cockpit remembers its speeds. *Cogn Sci*. 1995;19(3):265-288. doi:10.1016/0364-0213(95)90020-9

66. Hutchins E. *Cognition in the Wild* (Hutchins Edwin, ed.). MIT; 1995.

67. Hutchins E. The cultural ecosystem of human cognition. *Philos Psychol*. 2014;27(1):34-49. doi:10.1080/09515089.2013.830548

68. Hutchins E. Enculturating the supersized mind. *Philos Stud*. 2011;152(3):437-446. doi:10.1007/s11098-010-9599-8

69. Hutchins E. Ecological cognition and cognitive ecology. *Proc Hum Factors Ergon Soc Annu Meet*. 2000;44(22):566-569. doi:10.1177/154193120004402218

70. Hollan J, Hutchins E, Kirsh D. Distributed cognition. *ACM Trans Comput-Hum Interact*. 2000;7(2):174-196. doi:10.1145/353485.353487

71. Dubbels B. Cognitive ethnography: a methodology for measure and analysis of learning for game studies. *Int J Gaming Comput Mediat Simul*. 2011;3(1):68-78. doi:10.4018/jgcms.2011010105

72. Trasmundi SB. *Errors and Interaction*. John Benjamins Publishing Company; 2020.

73. Baber C, Smith P, Cross J, Hunter J, McMaster R. Crime scene investigation as distributed cognition. *Pragmat Cogn*. 2006;14(2):357-385. doi:10.1075/pc.14.2.14bab

74. Pedersen SB. Interactivity in health care: bodies, values and dynamics. *Lang Sci (Oxford)*. 2012;34(5):532-542. doi:10.1016/j.langsci.2012.03.009

75. Perry M. Socially distributed cognition in loosely coupled systems. In: *Cognition Beyond the Brain*. Springer London; 2013:147-169. doi:10.1007/978-1-4471-5125-8_9

76. Weick KE, Roberts KH. Collective mind in organizations: heedful interrelating on flight decks. *Adm Sci Q*. 1993;38(3):357-381. doi:10.2307/2393372

77. Westen D, Rosenthal R. Construct validity of psychological tests: fifty years after Cronbach and Meehl (1955): improving construct validity: cronbach, Meehl, and Neurath's ship. *Psychol Assess*. 2005;17(4):409-412.

78. Alač M, Hutchins E. I see what you are saying: action as cognition in fMRI brain mapping practice. *J Cogn Cult*. 2004;4(3-4):629-661. doi:10.1163/1568537042484977

79. Heath C, Hindmarsh J, Luff P. Video in qualitative research: analysing social interaction in everyday life. In: *Video in Qualitative Research: Analysing Social Interaction in Everyday Life*. 2017:1-13. Published online 2017. doi:10.4135/9781526435385

80. Trasmundi SB, Steffensen SV. Meaning emergence in the ecology of dialogical systems. *Psychol Lang Commun*. 2016;20(2):154-181. doi:10.1515/plc-2016-0009

81. Norris S. *Analyzing Multimodal Interaction*. 1st ed. Routledge; 2004. doi:10.4324/9780203379493

82. Kvale S, Brinkmann S. *Interview: det kvalitative forskningsinterview som håndværk*. 3. udgave (Steinar Kvale, Svend Brinkmann, eds.). Hans Reitzel; 2018.

83. Silverman D. *Interpreting Qualitative Data: Methods for Analyzing Talk, Text and Interaction*. 3. ed. (Silverman D, ed.). Sage; 1993.

84. Neyland D. *Organizational Ethnography*. Sage; 2008.

85. Mondada L. Challenges of multimodality: language and the body in social interaction. *J Socioling*. 2016;20(3):336-366. doi:10.1111/josl.1_12177

86. Steffensen SV, Trasmundi SB. Cognitive event analysis: a method for studying cognitive processes in embodied, multimodal interaction. Paper presented at: 4th Copenhagen Multimodality Day; 2018, København, Denmark.

87. Lebahn-Hadidi M, Abildgren L, Hounsgaard L, Steffensen SV. Integrating cognitive ethnography and phenomenology: rethinking the study of patient safety in healthcare organisations. *Phenomenol Cogn Sci*. 2023;22(1):193-215. doi:10.1007/s11097-021-09780-9

88. Steffensen S. Human interactivity: problem-solving, solution-probing and verbal patterns in the wild. In: Cowley SJ and Vallée-Tourangeau F, eds. *Cognition Beyond the Brain: Computation, Interactivity and Human Artifice*. Springer-Verlag; 2013:195-221. https://doi.org/10.1007/978-1-4471-5125-8_11

89. Steffensen SV, Vallée-Tourangeau F, Vallée-Tourangeau G. Cognitive events in a problem-solving task: a qualitative method for investigating interactivity in the 17 animals problem. *J Cogn Psychol (Hove)*. 2016;28(1):79-105. doi:10.1080/20445911.2015.1095193

90. Streeck J, Goodwin C, LeBaron CD. *Embodied Interaction: Language and Body in the Material World* (Streeck Jürgen, Goodwin Charles, LeBaron CD, eds.). Cambridge University Press; 2011.

91. Leonardi PM. Materializing strategy: the blurry line between strategy formulation and strategy implementation. *Br J Manage*. 2015;26(S1):S17-S21. doi:10.1111/1467-8551.12077

92. Nørgaard B, Ammentorp J, Ohm Kyvik K, Kofoed PE. Communication skills training increases self-efficacy of health care professionals. *J Contin Educ Health Prof*. 2012;32(2):90-97. doi:10.1002/chp.21131

93. Greenhalgh T, Robert G, MacFarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q*. 2004;82(4):581-629. doi:10.1111/j.0887-378X.2004.00325.x

94. Bro Pedersen S. The cognitive ecology of human errors in emergency medicine: an interactivity-based approach. Published online 2015.

95. Linell P. *Rethinking Language, Mind, and World Dialogically*. Information Age Publishing, Incorporated; 2009.

96. Kaplan RS, Norton DP. The balanced scorecard: measures that drive performance. *Harv Bus Rev*. 2005;83(7):172.

97. Higgs M, Rowland D. All changes great and small: exploring approaches to change and its leadership. *J Change Manage*. 2005;5(2):121-151. doi:10.1080/14697010500082902

98. Beer M, Nohria N. Cracking the code of change. *Harv Bus Rev*. 2000;78(3):133–216.

99. Balogun J, Johnson G. Organizational restructuring and middle manager sensemaking. *Acad Manage J*. 2004;47(4):523-549. doi:10.2307/20159600

100. Maitlis S. The Social Processes of Organizational Sensemaking. *The Academy of Management Journal* 2005;48(1).

101. Thomas JB, Clark SM, Gioia DA. Strategic sensemaking and organizational performance: linkages among scanning, interpretation, action, and outcomes. *Acad Manage J*. 1993;36(2):239-270. doi:10.5465/256522

102. Stensaker I, Falkenberg J, Grønhaug K. Implementation activities and organizational sensemaking. *J Appl Behav Sci*. 2008;44(2):162-185. doi:10.1177/0021886307313794

103. Floyd SW, Wooldridge B. Managing strategic consensus: the foundation of effective implementation. 1992.

104. Dettweiler U, Becker C, Auestad BH, Simon P, Kirsch P. Stress in school. Some empirical hints on the Circadian cortisol rhythm of children in outdoor and indoor classes. *Int J Environ Res Public Health*. 2017;14(5):475. doi:10.3390/ijerph14050475

105. Stevenson MP, Schilhab T, Bentsen P. Attention Restoration Theory II: a systematic review to clarify attention processes affected by exposure to natural environments. *J Toxicol Environ Health B Crit Rev*. 2018;21(4):227-268. doi:10.1080/10937404.2018.1505571

106. Mangen A. Digitization, reading, and the body. In: *A Multidisciplinary Approach to Embodiment*. 2020:51-55. Published online July 17, 2020. doi:10.4324/9780429352379-11/DIGITIZATION-READING-BODY-ANNE-MANGEN

107. Schilhab T. Interactional expertise as primer of abstract thought. In: *The Third Wave in Science and Technology Studies*. Springer International Publishing; 2019:283-295. doi:10.1007/978-3-030-14335-0_16

108. Kokkola L. Envisaging "our" nation: politicized affects in minority language literature. *Child Lit Educ*. 2019;50(2):142-159. doi:10.1007/s10583-017-9340-8

109. Fabry RE, Kukkonen K. Reconsidering the mind-wandering reader: predictive processing, probability designs, and enculturation. *Front Psychol*. 2019;9(January). doi:10.3389/FPSYG.2018.02648

110. Steffensen SV. Care and conversing in dialogical systems. *Lang Sci (Oxford)*. 2012;34(5):513-531. doi:10.1016/j.langsci.2012.03.008

111. Raczaszek-Leonardi J, Debska A, Sochanowicz A. Pooling the ground: understanding and coordination in collective sense making. *Front Psychol*. 2014;5(October). doi:10.3389/FPSYG.2014.01233/ABSTRACT

112. Secchi D, Cowley SJ. Cognition in organisations: what it is and how it works. *Eur Manag Rev*. 2021;18(2):79-92. doi:10.1111/emre.12442

113. Vaughan D. *The Challenger Launch Decision Risky Technology, Culture, and Deviance at NASA*. University of Chicago Press; 1996.

114. Gibson JJ. *The Ecological Approach to Visual Perception*. Houghton Mifflin; 1979.

115. Trasmundi SB. Distribueret kognition og distribueret sprog: analyse af kognitive events i en akutmedicinsk social praksis. *NyS Nydanske Studier & Almen Kommunikationsteori*. 2016;1(50):55. doi:10.7146/nys.v1i50.23798

116. Suchman LA. *Plans and Situated Actions: The Problem of Human-Machine Communication*. Cambridge University Press; 1987.

117. Hammersley M, Atkinson P. *Ethnography*. 4th ed. Routledge; 2019. doi:10.4324/9781315146027

118. Glasdam S. *Bachelorprojekter indenfor det sundhedsfaglige område: indblik i videnskabelige metoder*. 2. udgave. 1. oplag. (Glasdam S, Beedholm K, eds.). Nyt Nordisk Forlag; 2015.

119. Béhague DP, Gonçalves H, Victora CG. Anthropology and epidemiology: learning epistemological lessons through a collaborative venture. *Cienc Saude Colet*. 2008;13(6):1701-1710. doi:10.1590/S1413-81232008000600002

120. McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. A critical review of simulation-based medical education research: 2003-2009. *Med Educ*. 2010;44(1):50-63. doi:10.1111/j.1365-2923.2009.03547.x

121. McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. Effect of practice on standardised learning outcomes in simulation-based medical education. *Med Educ*. 2006;40(8):792-797. doi:10.1111/j.1365-2929.2006.02528.x

122. Phillips L, Scheffmann-Petersen M. Minding the gap between the policy and practice of patient-centeredness: cocreating a model for tensional dialogue in the "active patient support" program. _Qual Health Res_. 2020;30(9):1419-1430. doi:10.1177/1049732320913855

123. Peters G. Metadiscourse, materiality and morality in communication skills training with simulated patients. _Commun Med_. 2021;16(3). doi:10.1558/CAM.39725)

124. Steinemann S, Berg B, Skinner A, et al. In situ, multidisciplinary, simulation-based teamwork training improves early trauma care. _J Surg Educ_. 2011;68(6):472-477. doi:10.1016/j.jsurg.2011.05.009

125. Fioratou E, Flin R, Glavin R, Patey R. Beyond monitoring: distributed situation awareness in anaesthesia. _Br J Anaesth_. 2010;105(1):83-90. doi:10.1093/bja/aeq137

126. Rosen MA, Hunt EA, Pronovost PJ, Federowicz MA, Weaver SJ. In situ simulation in continuing education for the health care professions: a systematic review. _J Contin Educ Health Prof_. 2012;32(4):243-254. doi:10.1002/chp.21152

127. Walker ST, Sevdalis N, McKay A, et al. Unannounced in situ simulations: integrating training and clinical practice. _BMJ Qual Saf_. 2013;22(6):453-458. doi:10.1136/bmjqs-2012-000986

128. Gjeraa K, Møller TP, Østergaard D. Efficacy of simulation-based trauma team training of non-technical skills. A systematic review. _Acta Anaesthesiol Scand_. 2014;58(7):775-787. doi:10.1111/aas.12336

129. Patterson MD, Geis GL, Falcone RA, LeMaster T, Wears RL. In situ simulation: detection of safety threats and teamwork training in a high risk emergency department. _BMJ Qual Saf_. 2013;22(6):468-477. doi:10.1136/bmjqs-2012-000942

130. Schroedl CJ, Corbridge TC, Cohen ER, et al. Use of simulation-based education to improve resident learning and patient care in the medical intensive care unit: a randomized trial. _J Crit Care_. 2012;27(2):219.e7-219.e13. doi:10.1016/j.jcrc.2011.08.006

131. Lois F, Jaffrelot M. In situ simulation. In: _Clinical Simulation: Education, Operations and Engineering_. Elsevier; 2019:555-567. doi:10.1016/B978-0-12-815657-5.00039-5

132. Andersen SAW, Konge L, Cayé-Thomasen P, Sørensen MS. Learning curves of virtual mastoidectomy in distributed and massed practice. _JAMA Otolaryngol Head Neck Surg_. 2015;141(10):1-6. doi:10.1001/jamaoto.2015.1563

133. Wayne DB, Didwania A, Feinglass J, Fudala MJ, Barsuk JH, McGaghie WC. Simulation-based education improves quality of care during cardiac arrest team responses at an academic teaching hospital. _Chest_. 2008;133(1):56-61. doi:10.1378/chest.07-0131

134. Breckwoldt J, Lingemann C, Wagner P. Resuscitation training for lay persons in first aid courses: transfer of knowledge, skills and attitude. _Anaesthesist_. 2016;65(1):22-29. doi:10.1007/s00101-015-0113-8

135. Edelson DP, Litzinger B, Arora V, et al. Improving in-hospital cardiac arrest process and outcomes with performance debriefing. _Arch Intern Med (1960)_. 2008;168(10):1063-1069. doi:10.1001/archinte.168.10.1063

136. Kobayashi L, Parchuri R, Gardiner FG, et al. Use of in situ simulation and human factors engineering to assess and improve emergency department clinical systems for timely telemetry-based detection of life-threatening arrhythmias. _BMJ Qual Saf_. 2013;22(1):72-83. doi:10.1136/bmjqs-2012-001134

137. Cheng A, Grant V, Auerbach M. Using simulation to improve patient safety: dawn of a new era. _JAMA Pediatr_. 2015;169(5):419-420. doi:10.1001/jamapediatrics.2014.3817

138. Weinstock PH, Kappus LJ, Garden A, Burns JP. Simulation at the point of care: reduced-cost, in situ training via a mobile cart. _Pediatr Crit Care Med_. 2009;10(2):176-181. doi:10.1097/PCC.0b013e3181956c6f

139. Nickson CP, Petrosoniak A, Barwick S, Brazil V. Translational simulation: from description to action. _Adv Simul (London)_. 2021;6(1):6-6. doi:10.1186/s41077-021-00160-6