'Old Habits Die Hard': How to manage habitual constrains and possibilities in the training of experienced clinicians?

Ole Lund

Centre for Health Sciences Education, Aarhus University

Palle Juul-Jensens Boulevard 82, Bygn. B

DK-8200 Aarhus N

E-mail: ole.lund@gmail.com

Phone: +45 21705025

Berit Andersen

Department of Public Health Programmes, Regional Hospital of Randers, and Department of Clinical Medicine, Aarhus University

Skovlyvej 1, building 11

DK-8900 Randers C

E-mail: berit.andersen@stab.rm.dk

Phone: +45 78420171

Mette Krogh Christensen

Centre for Health Sciences Education, Aarhus University

Palle Juul-Jensens Boulevard 82, Bygn. B

DK-8200 Aarhus N

E-mail: mkc@cesu.au.dk

Phone: +45 8620 5227

'Old Habits Die Hard': How to manage habitual constrains and possibilities in the training of experienced clinicians?

ABSTRACT

Training experienced clinicians for the purpose of unlearning old habits, learning new skills, and improving conscious competence may pose a considerable challenge to trainers. Exploring habitual constrains and possibilities – in short, the habitus – of the experienced clinicians will help us to understand why some clinicians might instinctively dig in their heels when faced with new teachings. This article explores two interrelated aspects of training experienced clinicians: first, the way in which the habitus among experienced clinicians influence unlearning old habits and acquiring new skills; second, the pedagogical investments and teaching methods among experienced trainers in their endeavor to change old habits in experienced clinicians. Data was obtained in a case study. Participants were experienced colonoscopists and expert colonoscopy trainers from Denmark and UK. Results show that 1) the clinicians' responsiveness to the training is influenced by tacit skills and underlying logics shared within their daily work environments, and 2) a multifaceted approach of the expert trainers based on four investments (relation-building, intellectualization, asymmetry, and sensing and scaffolding) enabled them to impact the clinicians' logic of practice and create buy-in – or: *illusio* – in the clinicians. The article reflects the importance of regarding clinical skills and motivations as socially constructed habits and the role of the trainer as a matter of 'fleshing out' authority. As a conclusion, we suggest three ways in which trainers and faculty developers may be able to overcome the experienced clinicians' habitual constrains and ingrained resistance to change.

Key words: changing habits; colonoscopy; continued training of experienced clinicians; faculty development; habitus; illusio; motivation; surgery.

INTRODUCTION

Surgery and the techniques of examining and treating the inner structures of the body is a craftsmanship. The craftsmanship of colonoscopy (in short CSPY) is the careful examination of the inner lining of rectum and colon by use of a thin, flexible tube with a small video camera called a colonoscope to look at the colon. This particular craftsmanship is a highly complex skill that takes years to master in an excellent way (Shahidi et al., 2014; Valori, 2012). Expert clinicians get to the cecum more often, use less sedation, cause less discomfort, achieve a better patient experience, and find more polyps (Valori et al., 2010; Valori et al., 2012). However, when a clinician masters CSPY, he or she often becomes unconscious competent in performing the CSPY, i.e. the clinician may perform it without conscious thought (Ramani and Leinster, 2008), because the competency has become a tacit routine and an ingrained habit.

It has been argued that tacit knowledge and intuitive expertise are the most desirable forms of knowledge in a craftsmanship such as surgery (Dreyfus, 2001), because it allows the clinician to act quickly and correct in difficult situations. But when new techniques arise and old habits need change, it challenges and perhaps even threatens the intuitive expertise and unconscious competent craftsmanship of the experienced clinician. Old habits die hard, and up until today it remains unclear how the ingrained habits of experienced clinicians can be bypassed and changed.

In this article, we aim to explore the habitual constrains and possibilities involved in experienced clinicians' learning of new skills and, in particular, new ways of teaching CSPY. We find it important to explore habitual constrains and possibilities – in short, the so-called habitus – of the experienced clinicians as this will help us to understand why some clinicians might instinctively dig in their heels when faced with new teachings and why this might happen also when the experienced clinicians train their colleagues. Furthermore, we find it important to investigate the pedagogical investments and

teaching methods among experienced trainers in their endeavor to change old habits in experienced clinicians as this will help us to optimize the training of future trainers.

Teaching and learning the skills of CSPY is a growing research field which include a broad range of studies such as measurement of competency in CSPY (Jorgensen et al., 2013; Koch et al., 2012; Shahidi et al., 2014), simulation training versus hands-on or bedside training in CSPY (Mahmood and Darzi, 2004; McIntosh, 2014; Haycock et al., 2010), and trainees' view on teaching in clinical endoscopy (Wells et al., 2009). Most of these studies concentrate on trainees and residents training to be competent and independent clinicians. For example, a systematic review of the learning curve for achieving competency in performing CSPY (Shahidi et al., 2014) showed that CSPY is a difficult and technically demanding procedure that require significant time and practice of the trainee and resident to master the psychomotor and cognitive aspects of the procedure. The review also showed that defining procedural thresholds, i.e. the number of CSPYs for trainees and residents to complete before being deemed competent, is critical to the trainees' and residents' journey towards being an excellent and independent clinicians. The vast amount of practice and several hundred procedures needed to perform CSPY competently, i.e. in a safe, effective, and comfortable manner, give rise to considering simulation training a tool for skills training prior to clinical practice. A multinational, randomized, blinded, controlled trial of simulator versus bedside training showed that performance of novices trained on the CSPY simulator matched the performance of those with standard patient-based CSPY training (Haycock et al., 2010). In addition, a few studies concern quality in CSPY (Gavin et al., 2013; Valori, 2012). For example, based on a thorough inspection of the concept of quality assurance of colorectal cancer screening, Valori and colleagues concluded that "quality is a multi-dimensional concept that requires continuous monitoring of a variety of indicators and a culture of excellence supported by effective clinical and managerial leadership" (Valori et al., 2010). So saying, the authors stress the importance of quality in basic as well as continued training of novice clinicians and experts alike. Whilst the above-

mentioned studies exemplify the target group of the majority of studies in CSPY training: the novice clinicians, it could be argued that these studies may not reflect the training of experienced clinicians.

To the best of our knowledge, only a few previous studies have explored the continued training of experienced clinicians (Coderre et al., 2010; Jorgensen et al., 2013; Valori et al., 2012). From research in training experienced surgeons we know that being an experienced clinician alone may not equip the doctor to become a responsive learner of new skills nor a successful educator of novice clinicians (Khan et al., 2013). Moreover, professional values and the traditions of practice in CSPY may be influenced by local and national cultures and habits, and these cultures and habits most likely shape the "cultivation" and training of clinicians (de Cossart and Fish, 2005). In particular, the training of *experienced* clinicians for the purpose of unlearning old habits, learning new skills and improving conscious competence may pose a considerable challenge to trainers (Ramani and Leinster, 2008). Likewise, the British sociologist Nick Crossley (2001) described the way in which habitual ways of thinking and acting, or what might be called the operations of the *habitus*, fundamentally influence human activity such as learning and performing skills.

On this background, our study aimed to explore two interrelated aspects of the training of experienced clinicians:

1) the way in which the habitual constrains and possibilities (the *habitus*) in the experienced clinicians influence unlearning old habits and acquiring new skills, and
2) the pedagogical investments and teaching methods among experienced educators in their endeavor to change old habits in experienced clinicians.

CONCEPTUAL FRAMEWORK

Our analyses was inspired by sociological theory and departed in the concepts *habitus* and *illusio* (Crossley, 2001, 2005). The concept of habitus can be considered a metaphor for the experienced clinician's dispositions and for how this clinician inhabits the environment in which he or she works, and the underlying and tacit *logics of practice* that they live by. Crossley described habitus in this way:

"An agent's habitus is an active residue or sediment of his past that functions within his present, shaping his perception, thought, and action and thereby molding social practice in a regular way. It consists in dispositions, schemas, forms of know-how and competence, all of which function below the threshold of consciousness". (2001, p. 93).

In this article, we regard habitus as a dynamic and fluid internalization of skills, cultural norms, values and logics, and as "a structure-in-process" (Crossley, 2004) that is developed and develops in the individual's interactions with both others and the environment. Because large parts of the habitus are affected by social and cultural norms, habitus is partly shared with for example one's country men, family or colleagues at work. Thus, habitus is not to be understood as a purely individual phenomenon, but a socially constructed practical sense and a practical identity, that we share with similarly disposed groups of persons. For example, habitus is the practical sense and the practical identity that feels comfortable, right, useful and valuable for a group of clinicians when they act as professionals.

Learning requires the learners' commitment to and immersion in the practice that they attempt to master and it requires that the learners find the practice meaningful and appealing. The sociological concept of *illusio* describes the appeal that a field of practice, such as CSPY, can have on its participants and the investment that these participants capitalize in their participation (Crosley, 2005). *Illusio* comes from the Latin term *illūdere*, which means to create an illusion or make a game of something. A game is only a game as long as the participants maintain the illusion of the game; they must *make-believe* in a way which involves the systematic failure to recognize that what they are doing is *just* playing a game (Crossley, 2005), no matter how serious it may be. Playing a game involves adhering to rules, virtues,

sayings, and doings of this particular game. Thus the concept of illusio may explain how a learner's immersion in a field of practice requires that the learner *buys into* and internalizes the underlying logics of this particular practice and becomes caught up in and by the game (McGillivray et al., 2005). The learner's interactions with and relationship to other participants within this practice determines the learner's investment and immersion in the practice (Crossley, 2001; 2005), which suggests that motivation to learn is not just a mental condition inside the learner's head, but is also being developed (or at worst reduced) in the interactions with co-learners, trainers etc.

From this perspective a successful learning situation, that is a learning situation that results in the development of desirable knowledge and skills in the learner, must teach the learners the underlying logics of the practice – the illusio – that is to be learned. This will make the learning situation meaningful and appealing to the learners. Or in other words: the learning situation becomes a game worth playing. Thus a successful learning situation (and the successful trainer) creates buy-in among learners and develops an illusio which affords the learners to concentrate all their resources in order to complete the task of the situation in a particular way. However, learning situations often confront learners with ways of doing things which the learners do not inhabit and therefore presuppose an underlying logic of practice that the learners are not yet familiar with. In these situations the learners might have a hard time adapting new knowledge and skills to their own logics of practice, because they do not buy into the illusio needed for valuing this alternative approach to practice. As an example, a disrupted illusio may result in an erosion of professional capacity (Colley, 2012). Thus one important task of trainers is to develop the learner's experience of illusio and thereby facilitate a fit between the learner's underlying logic of practice and the logic of practice of the teaching situation. This may happen when 1) the learners feel that their habitual relation to practice is legitimized and taken into consideration by the trainers, 2) the learners experience that the teaching situation builds on their current habits and advances their performances, and 3) the trainers create buy-in and provide the learners the access to

the trainers' underlying logics of practice (van Manen, 1995; Wenger, 1998). On this basis we find it important to explore the interconnection between habitual constrains and possibilities (the *habitus*) in the experienced clinicians and the pedagogical investments and teaching methods among experienced educators in their endeavor to change old habits in experienced clinicians.

METHOD

In order to ensure transparency and reliability, we hereby provide a detailed description of how this study was carried out. The design of the study was an instrumental case study as described by Robert E. Stake (Stake, 1995). Stake (1995) argues that case studies in general hardly provide the basis for generalization, but case studies of an instrumental kind, i.e. having a general research question or issue as focal point which we seek insight into by studying a particular case, may provide general understanding of the question or issue in focus. In the design of this case study we were using the *particular case* of a training program (see below) to establish a *general understanding* of implications of training the expert to teach. As such the case study was an instrumental case study because we observed the characteristics of an individual unit (the training program) in order to approach a general understanding of the two research questions in focus. Data for the case-study was obtained from a short-term ethnographic field work (Musaeus, 2012) and in-depth interviews (Kvale and Brinkmann, 2009).

Context

From the year 2014 a national colorectal cancer screening program was rolled out in Denmark. All citizens aging 50–74 years regularly receive an invitation with equipment to obtain a stool sample. This sample can be obtained at home and mailed to the laboratory for analysis for traces of blood. If analysis of the stool is positive a CSPY will be offered to the citizen with the aim to detect colorectal cancers at early stages and to detect and remove adenomas. This requires increased CSPY capacity and in order to

ensure high quality CSPYs along with the higher demand of the procedures, Central Denmark Region (one of five administrative units in Denmark with responsibility for healthcare, hospital services, health insurance, general practitioners and specialists) launched a highly specialized training support and development program (The TCT program) for CSPY services (Valori et al., 2010): the TCT program (Training the Colonoscopy Trainer program) for CSPY services. This program aimed to improve training provision for a new generation of clinicians and improve the quality of established clinicians in Denmark. The program consisted of three courses of two days: 1) CSPY skills improvement training, 2) Basic and advanced polypectomy, and 3) Training the CSPY trainers.. As emphasized by the program provider, an essential part of the clinicians' training was to develop their conscious competence, i.e. their explicit understanding of how they perform CSPY, in order to develop a cohort of 13 expert clinicians that will train the next generation of clinicians to the highest international standards.

Participants

Participants were 12 experienced clinicians (of which 11 were surgeons, 1 was gastroenterologist, 9 were male and 3 were females). The participants were selected by the head of the four colorectal departments that take part in the colorectal cancer screening program in Central Denmark Region. The head of the units were asked to select the most experienced clinicians in their department. Thus our study unit in the case study was the 12 participants and their 2-3 British trainers in the three courses of the TCT program. We collected data from two sources: field work during the three courses and in-depth interviews with 10 of the 12 participants.

Field work

The principal author of this article did the field work through ten days of observations during the entire TCT program held on three occasions in April, June and October 2014. He participated as a passive participant (Spradley, 1980) which meant he was present as a bystander at course activities such as

introductory dinner, class-room based sessions, demonstrations, supervision and case-training sessions, debriefings, evaluations, lunches, coffee breaks etc. In addition, he took part in several informal conversations with the participants and the trainers and aimed at gaining insight into the atmosphere and emotionality in which the training was carried out by attending to the *sensoriality* of practice (Pink, 2009). Field notes were taken at the time, mostly in the form of cues and short sentences, and these were further developed into more detailed descriptions within hours after having made each observation. The detailed field notes (55 double-spaced pages) included descriptions of transpiring events, moods, conversations, ways of interacting, gestures, use of voice and reflections on what educational strategies that were put in use in the different training situations. Also included were the ways in which the training situations developed the participants' investment in and *feel for* the procedures and methods of the British trainers.

In-depth interviews

In between the 2nd and 3rd training session in TCT program we conducted interviews with ten clinicians. In advance we prepared a semi-structured interview guide (Kvale and Brinkmann, 2009) taking point of departure in data from the observations. The purpose of the interviews was to invite the participants to elaborate on how they experienced the training during the courses, and how they experienced and were affected by the trainers' way of training them. As with the field work, the interviews were carried out by the principal author, and this provided the dialogues in the interviews with actual and shared situations from the observations as a concrete frame of reference during the interviews. The interviews were audiotaped and in total the recordings lasted 6 hours.

Data analysis

We organized and coded the three sets of field notes and the ten interview recordings by using NVivo 10. This software allows a researcher to combine field notes with audio recordings of the interviews and

code them in the same program. We reviewed data several times and conducted the analyses in three steps.

In step one, we coded the data deductively in relation to the characteristics of two common educational strategies in medical education (Ramani and Leinster, 2008): deliberate practice and apprenticeship learning. Literature on training of (future) experts and development of expertise shows that deliberate practices as well as apprenticeship learning are highly effective and necessary forms of learning when one aims to develop domain-specific high-quality skills. The concept of deliberate practice (Ericsson et al., 1993; Ericsson, 2007) focuses on individual acquisition of knowledge and skills, and is a highly structured activity explicitly directed at improvement of performance in a particular domain. It includes repetitive performance of intended cognitive or psychomotor skills, rigorous skills assessment, specific information feedback, and better skills performance (Duvivier et al., 2011). We generated five deductive codes about learning in relation to deliberate practice: Intellectualization: academization of skills and competencies; Pointing out failures and giving correctional feedback; Guiding and educating the clinicians' attention; Training on the edge of one's comfort zone; Concentrated and deliberate focus on improvement. The concept of apprenticeship learning focuses on social learning (Wenger, 1998; Wenger et al., 2002) when the learner engages in practicing and working together with other practitioners and experts in a specific domain. In this way, apprenticeship is an embodied and mutually affecting process – a process that involve not only skills but also values and understandings of professional standards – rather than as unidirectional exchanges of information (Dreyfus, 2001). We generated four deductive codes about apprenticeship learning: Relation-building: Investment in building relationship and engagement between trainer and clinician; Asymmetry: Accentuating the authority and respect of the trainer; Sensing and scaffolding: hands-on experiences and learning by doing; Identification, imitation and role-modeling.

In step two we conducted inductive analysis and coded themes that were not captured by the deductive analysis but which stood out as influential to the clinicians processes of learning, for example cultural barriers and the significance of old habits. This analysis emphasized that the training of the experienced clinicians was not just a question of introducing the clinicians to new scoping techniques, but much of the training involved dealing with and impacting underlying forces and motives that guided the clinicians' practices in order to make them responsive to the technical teachings in first place.

As a consequence of the insights we reached during the deductive and inductive coding of the data we proceeded to the third and final step of analysis.

In step three, we conducted a theoretical reading (Kvale and Brinkmann, 2009) of the most frequently appearing codes in the data material (codes with more than 30 quotations distributed over more than 10 data units). The theoretical reading was conducted from the perspective of the sociological concepts of *habitus* and *illusio*, because these concepts have been widely recognized for their ability to capture the underlying – and often tacit and unknown – logics behind human action. Thus we used these concepts to facilitate interpretations of data and discussions of the way in which the learning situations created buy-in among clinicians.

The interpretation of data was developed and validated in processes of researcher triangulation during study group meetings between the three researchers, and in processes of participant triangulation during informal talks with the participants during the field work, and by presenting the preliminary interpretations of data to the participants after the TCT program and inviting them to comment on this (Fiordelli et al., 2014). Furthermore it was of great importance that the interpretations happened in conjunction with the insider view and embodied, sensorial and emotional knowing (Pink, 2009) that the principal author had developed by being close to the participants' training during the courses. In the analysis process, researchers risk abstracting themselves from the field of research and over-

interpreting and simplifying the meaning of data. Thus we aimed at upholding the connection to practice by continuously testing interpretations against the insider view of the principal researcher (embodied triangulation).

Ethics

The study was exempt from ethics review by the regional ethics committee. The authors also obtained permission from the Danish Data Protection Agency to use and combine the specific data generated in the field work and interviews for the purpose of this study as required by Danish law. Prior to participation in the study all participants signed a statement of consent. The participants were anonymized in the presentation of data and we gave the participants fictitious names.

RESULTS

As a first result, the reading and analysis of the complete code tree reveals two dominant themes: 1) The tacit skills and logics influencing the clinicians' responsiveness to the training, and 2) The multifaceted approach of the expert trainers. The two dominant themes emerge on the basis of the most frequently appearing codes in the data material (codes with more than 30 quotations distributed over more than 10 data units) in combination with the theoretical reading of these codes. The complete code tree including deductive and inductive codes, the total number of quotations, and the resulting dominant themes is illustrated in table 1.

Table 1: Code tree and dominant themes

	Step one: Deductive analyses resulted in 9 codes	**Total number of data units**	**Total number of quotations**	**Dominant theme**
	Relation-building: Investment in building relationship and engagement between trainer and clinician	**11**	**64**	**Creating buy-in: The multifaceted approach of the expert trainers**
	Intellectualization: academization of skills and competencies	**11**	**40**	
	Asymmetry: Accentuating the authority and respect of the trainer	**11**	**37**	
	Sensing and scaffolding: hands-on experiences and learning by doing	**11**	**35**	
13 data units: 3 sets of field notes and 10 interviews	Pointing out failures and giving correctional feedback	9	17	
	Guiding and educating the clinicians' attention	8	20	
	Identification, imitation and role-modeling	4	17	
	Training on the edge of one's comfort zone	4	6	
	Concentrated and deliberate focus on improvement	4	5	
	Step two: Inductive analyses resulted in 6 codes	**Total number of data units**	**Total number of quotations**	**Dominant theme**
	Clinicians are under the influence of their own routines and old habits	**11**	**49**	**Tacit skills and logics are strongly influencing the clinicians' responsiveness to the training**
	Clinicians are under the influence of cultural logics	**11**	**43**	
	The power of repetitions	9	14	
	Mirroring habits and routines	8	20	
	Constraining structural conditions	7	19	
	Developing the colonoscopists' investment – creating illusion	7	16	

The following presentation of the results start out by describing the ways in which tacit skills and logics are influencing the clinicians' responsiveness to the training, and then follows descriptions of the multifaceted approach of the expert trainers.

Habitual constrains and possibilities (the habitus) in the experienced clinicians

Our analysis revealed that experienced Danish clinicians have hitherto been accustomed to engage in a specific cultural logic of colonoscopy practice, which is based in underlying and unwritten rules and conventions. This logic encourages the clinicians in Denmark to carry out CSYP in a certain way that we may call *the Danish scoping logic*:

- they practice CSYP with minimal and reactive use of changing the patient's position, rapid insertion of the scope, and liberal use of anesthetics;
- they regard CSYP as routine work: the clinicians do it in haste and then rapidly move on to the next task leaving little time to inspect the interpretative habits and the underlying logics through which they make sense and master their practice;
- training situations is seen as situations where one's expertise are embattled or questioned and where one is taught by receiving criticism;
- experienced colonoscopists occupy a certain social role characterized by self-protective professional pride and a workmen identity – they primarily deal with manual labor and surgical production rather than academic reflection.

The Danish scoping logic described here poses some habitual constrains that complicates the process of learning new ways of scoping, because this particular logic encourage the clinicians to:

- speed up their practice and thus decrease their sensitivity to the functional relationship between scope-movements and the configurations of the patients' intestine,
- have a blind trust in their acquired scoping habits, and to
- have a strong skepticism to corrective advices and feedback.

The following quotations and analysis will substantiate and develop this result.

Tacit skills

Our data demonstrate that the clinicians relied heavily on tacit skills while scoping. This means that, over time, they have let the details of the technique utilized for maneuvering the scope sliding in the background of their attention. This is desirable because it allows the clinicians to concentrate on for instance finding their way in the bowel and searching for polyps. But at the same time, this might restrict them from being aware of and articulating what and why they do as they do.

"During the TCT program [we were asked to reflect on] what it is exactly that makes us advance in the bowel. And this is something that I'm not used to think about in my day-to-day work. We have often more or less randomly turned the scope a little bit and - in our department - we have given the patient more sedation." (Hans)

"So we have just done something which our experience tells us is right. But we haven't thought about why this is so." (Finn)

Furthermore, Ivan indicated that the incentives that makes one reflect on one's habits and logics of practice decreases, when you have reached a certain level of experience and charge at the ward:

"We have reached a point in our career in which we are not used to be supervised. […] When we operate, scope etc., we are often the one in charge. We rarely operate together with a colleague of same charge or higher. However, I do special tasks of surgery with a colleague from Aarhus. We have the same charge, but he has more experience than I. We learn tips and trick from each other by looking at what each other is doing and thinking: 'Hmm, you do it like this! I haven't thought about that!'" (Ivan)

By this Ivan expressed how the ability to reflect on one's own habits may arise from practicing with and reflecting on the ways of one's peers. However this is something that is rarely prioritized in work of the clinicians. Overall, the study shows that a culture has developed in the Danish context of CSPY that discourages the clinicians from questioning and inspecting their ingrained habits and logics of practice. The discouragement is developed early in the clinicians' career in so far that CSPY is usually taught 'silently'. More experienced clinicians show their younger and less experienced colleagues how they

perform CSPY without accompanying explanation. The clinicians in this study emphasized that they 'repeat' this way of teaching CSPY because like Bo says "*I can't explain what I do.*"

Routine work such as CSYP has lower status

Our study also detected a second logic of practice that guided the clinicians work. They were used to perceive CSPY as routine work and they did not ascribe it the same status as open surgery.

"We are surgeons […] not endoscopic surgeons! To a surgeon, surgery prevails. This is how it ought to be. That's how I think it should be. So you might have a tendency to downgrade CSPY […] we surgeons might have downgraded CSPY for a long while. We have always laughed at the non-surgical clinicians, because they could do four colonoscopies, while we did eight. But you can turn it around and think: this is wrong, if we have done a poor work and overlooked a lot of stuff, while they have done a good work and been careful. But this might be what you can call a 'Tarzan-attitude', which you might find among surgeons. We think: 'How long can it take? I don't want to fumble and dawdle at it. Let's move on!' We (surgeons) are quite impatient." (Ivan)

Among Danish clinicians there seems to be an implicit agreement to ascribe CSPY low status or even as "hack work" (Ivan). This logic of practice discourages the clinicians from putting their full investment at work. Furthermore, this underlying logic encourages the clinicians to speed up their scoping:

"10:51 AM. [During one of David's case training sessions] David clearly is used to scope in a fast tempo. It is difficult for him to advance the scope as slowly as the trainer would like him to. Again and again the trainer stresses the importance of advancing slowly: 'You have to push the scope as slowly you have ever pushed the scope, David!'" (Field notes)

"We are trained in the spirit that it's all about advancing fast. You are skilled if it takes you two minutes to get to cecum."(Finn)

Christine explained that the clinicians' up-paced tempo also was stimulated by time pressure that saturated the wards:

"Christine: We are all aware that every examination and surgical intervention is very important to the patient and time shouldn't play any big role in this. But when you every day hear that you need to hurry, that there are long waiting lists,

increasing number of patients and that we haven't got the time to…Well, you hear it so many times that eventually you believe it and align yourself with it.

Interviewer: And it affects each examination or each operation?

Christine: Yes it certainly does! You try to save as much time as you can."

This portrays an atmosphere of bustle and haste at the wards, which is nourished by e.g. long waiting lists, overbooked daily programs and cut-backs among staff. This atmosphere seems to have fundamental impact on the individual clinician's scoping habits.

Experienced clinicians' skepticism and self-protectiveness

Furthermore, our study showed that the habitus of the clinicians was characterized by professional pride and deep confidence in one's own abilities. This was reflected in the skepticism and self-protectiveness that the clinicians tended to show in regard to the new ideas and ways of the trainers.

"We are taught to be skeptical, when we are introduced to new methods. There are thousand opinions to how diseases should be treated and cured, and it is very difficult to say with certainty what the right method is. So we have a healthy skepticism as a starting point. And it is probably reinforced in this program because they introduce a new method in area where I might not consider myself as expert, but at least as very experienced. And when you are told: 'What you have done is not the best way to do it. We have a better one!' Your skepticism will be reinforced - as a starting point!" (Hans).

This skepticism and self-protectiveness seems to arise among the clinicians when they feel their underlying logics of practice are questioned or threatened. As depicted in the quotation beneath, skepticism might also arise in situations in which one receives training:

"David: It might be demanding to receive learning in Denmark, because receiving learning is sometimes regarded as criticism. There may be two reasons for it. It may be that the teacher expresses criticism instead of guidance. Or that the learner has so much pride that he or she cannot receive learning. It's probably a combination of both [...] Sometimes trainees might ask about how they are doing in the training, because 'nobody says anything.' 'No, when nothing is said, it is because everything goes fine!' [Laughs]

Interviewer: [Laughs] So that is the most positive feedback one can get?

David: Yes, and it is actually quite positive. But perhaps this attitude could change."

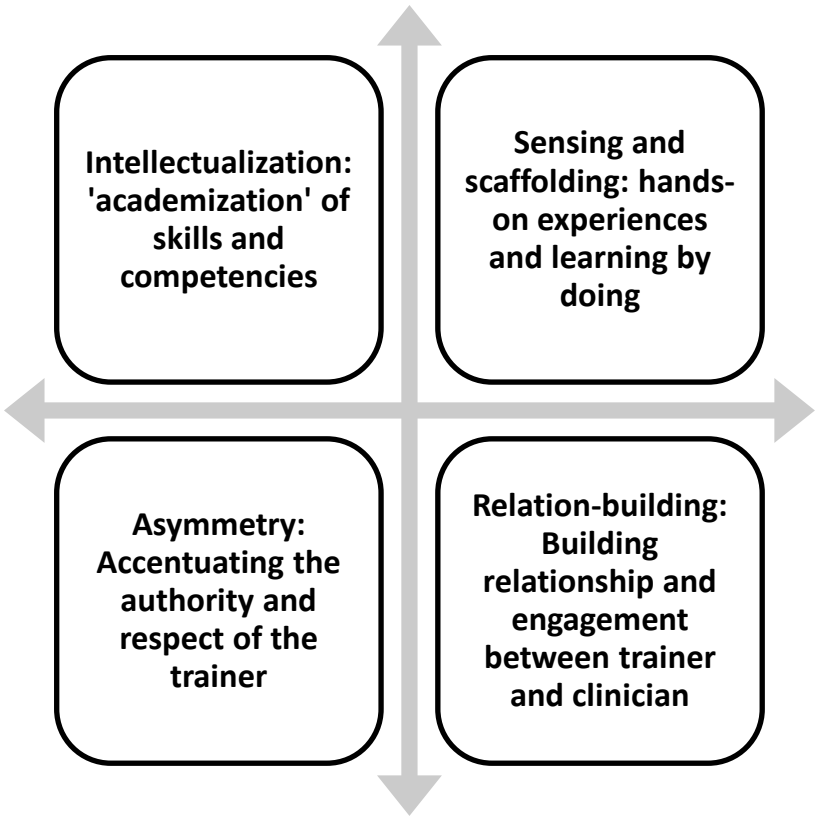
This suggests that previous training experiences have developed a certain kind of logic of practice among the clinicians which encourages them to be mainly skeptical when faced with alternative ways of scoping. Furthermore the Danish tradition of training in the form of criticism has developed an underlying expectation in the clinicians which make them receive feedback as criticism (even in cases where the feedback is not intended as such). At the outset of the TCT program, these above mentioned characteristics of the clinicians' habitus seemed to constrain them from being fully responsive to the training of the trainers. In the next section we will show how constrains were met and counteracted by the approach of the trainers.

The pedagogical investments and teaching methods among experienced trainers

Despite the abovementioned constrains the study shows that the pedagogical 'investments' and teaching methods of expert trainers were able to initiate learning, when they in addition to pure technical training also focused on impacting the clinicians' logic of practice and illusio within the training context, and thereby focused on developing a deeply felt sense of 'buy-in' in the clinicians to the way of scoping promoted and exemplified by the trainers.

As illustrated in figure 1, this theme is developed upon the interrelationship between four of the most frequently occurring codes in the data material, which also encouraged us to characterize the trainers' efforts to create 'buy-in' among the clinicians as multifaceted.

Figure 1: Creating buy-in: the multifaceted approach of the expert trainers



Relation-building

The clinicians voiced that the trainers' appreciating way of teaching, that is the way the trainers created buy-in among the clinicians by investment in building relationship and engagement between trainer and clinician, was helpful to the clinicians' own investment in the training activities during the course.

"You sense that [the trainers] are aware that they are talking to someone who is experienced and someone who has been scoping for 25-30 years." (Bo)

"Of course there are methods that they want us to acquire, but we are allowed to partake with our own knowledge. So it is not kind of imposed on us." (Gorm)

"You feel like being an equal, even if you are not an equal in the training situations." (David)

The trainers appeared attentive and recognizing towards the clinicians' ways of understanding and performing CSPY. As a consequence the clinicians appeared to be more open to the trainers' ways of doing things than first expected:

“You might become defensive if you are not recognized. If you just are being treated like a little cub. If they had greeted us with this approach, I think most of us would have dugged in our heels. But they absolutely did not.” (Finn)

This indicates that the trainers' relational approach helped disarming the habitual tendencies of approaching training situations with skepticism among the clinicians. In addition humor played an important part in the trainers’ and clinicians’ way of building relations. As an example:

“During a class-room-based teaching, one of the trainers asks Gorm a question and Gorm answers what the trainer is expecting. The trainer stretches his arms out toward Gorm like he is getting ready to hug Gorm and exclaims: ‘Gorm, I could kiss you!’. This causes laughter in the room, then the other trainer continues: ‘Maybe we need to leave these two guys to the room!’” (Field notes)

The frequent use of humor and the unpretentious atmosphere seemed to help the clinicians to break away from dogmatic notions about themselves which they are encouraged to live up to in their daily life at the wards. Thus in this atmosphere a practice of logic was developed which increased the clinicians’ responsiveness to the training by making it easier for them to break away from their professional pride and ingrained skepticism towards new learnings.

“[The trainers] put our feeling into words ... It's like when an author is able to articulate one's feelings in a novel for example. So you think: ‘Ah that's a nice description!’ They are able to articulate actions that you haven't been reflexive about. They thought through and uncovered what we have done unconsciously.” (Anders)

“He [the trainer] is standing right next to me. And I can <u>feel</u> that he has the experience. And he describes to me what I can <u>feel</u> with the scope, as I'm scoping.” (Bo)

The study shows that the trainers were sensible to the way the clinicians inhabit their practice and able to bring themselves in line with the logics of practice which guided the clinicians’ way of scoping. Moreover the trainers introduced a shared vocabulary about the individual feeling of scoping. These two capabilities in the trainers convinced the clinicians about the value of being able to perceive and articulate detailed tactile sensations during scoping as a way of building a relation that facilitates a ’fit’ between the learner’s underlying logic of practice and the logic of practice of the trainers.

Intellectualization

The trainers were often able to put into words what the clinicians already knew pre-reflectively and managed to hit a nerve in the clinicians that made them grasp the gains of learning to scope the way the trainers suggested. By using an advanced vocabulary about feelings and tacit knowledge, and by using intellectualization and academization of skills and competences related to the clinicians own experiences:

"Their way of explaining you about their scoping technique for example their ways of turning the patients in order to exploit the distribution of air and fluid in the optimum way is immediately obvious. And it makes the teachings much more inviting. An experienced surgeon who has made a thousand of colonoscopies will naturally have some built-in skepticism when someone thinks that they have found the philosopher's stone. But the way [the trainers] presented and explained their ways made it hard for us to find contradicting arguments that emphasized that this is not worth trying." (Gorm)

The trainers' arguments became convincing because they were in keeping with the underlying logics of the scientific realm of understanding that both parties adhered to, for instance when guiding the clinicians' attention to the way gravity influence fluids when arguing for turning the patients more frequently.

Asymmetry

The use of the underlying logics of the scientific realm of understanding not only gave the trainers' words weight, but it also positioned the trainers as authoritarian role-models in the eyes of the clinicians and it accentuated the asymmetry between experts and learners:

"They show us the rationale. [...]And every time you ask they demonstrate that they have thought things through [...] And they derive authority when we realize that there is no rationale behind our way of scoping. Their ways seems more academic rather than workman-like." (Anders)

By using causal and logical line of arguments the trainers also lived up to academic conventions of being reflective. Thus they appear as authorities in relation to the clinicians, who in comparisons felt more like 'workmen', i.e. persons who primarily deal with production rather than reflection.

But a well picked word or argument is only part of the multifaceted approach of the expert trainers. By virtue of well-orchestrated appearance and carefully chosen manners and skills the trainers expressed an extra layer of 'information' about their underlying logics of practice that were at least as efficient as their words in the process of convincing the clinicians to adapt the trainers’ ways of scoping:

“I like their style. And you can feel that they are passionate about it. They are able to express that this is the most enjoyable thing to do, and that you have to put all your efforts into it.” (Jens)

Not only did the trainers make the impression of being engaged expert trainers captivating the clinicians with their passion; they positioned themselves as expert clinicians:

“11:19 am. [David has for over 10 minutes tried to get past an obstacle in the patient's bowel] David is still not advancing. The trainer asks if he shall take over. He takes over and we can see on the screens [in the classroom] that by maneuvering the scope slowly, he advances quite quickly [...]The trainer hands the scope back to David while emphasizing that the most important thing is to go slowly.” (Field note)

In situations of shared practical involvement the trainers' habit behavior, their underlying logics of practice, and their skill level were concretized to the clinicians. And usually the trainers' skills appeared more advanced and fine-grained. On these grounds the authority relation between trainers and clinicians were further developed and the trainers’ way of scoping and their underlying logics of practice were emphasized and made desirable among the clinicians.

Sensing and scaffolding

As shown in the above section, a general and repeated instruction from the trainers to the experienced clinicians was to “slow down” when advancing the scope. The words “slow down” almost became a shared refrain during the program, because a slower pace during scoping increased the clinicians’

sensitivity to the functional relationships between scope-movements and the patients' intestine, and enabled the trainers to scaffold the clinicians' practical sense.

All the clinicians expressed that the hands-on experiences guided by the trainers were crucial for developing the abovementioned desire towards the trainers' more sensitive ways of scoping:

"For me it is still crucial to have hands on [the trainers' ways]. The feedback I get from the scope when I make certain movements or when feeling the adjustment options enables me to acquire the principles behind [the trainers' way]." (Gorm)

"You get the effect right away, right? You realize that 'hey, when I twist the scope the way he wants me to it helps and I advance. And if I turn the patient around, water and air is distributed the way [that they have told us].' So this is convincing and immediate feedback that goes right in. You cannot get more direct payoff. You realize when you do this [turn the patient around]: 'Hey yes, damn it helps!'" (Finn)

During the slow-paced case-training the verbal descriptions and guidance by the trainers affected the sensations and actions of the clinicians. Furthermore, our observations clearly revealed that the ideas and suggestions of the trainers were consolidated when the clinicians actively engaged in these while solving concrete practical problems, for example, when the clinicians came to realize that turning the patients (a method that was highly unfamiliar to the clinicians because it was assumed to delay the procedure) eased the advancement of the scope, and gave a better overview of the bowel. Due to the combination of guidance and direct sensuous and bodily 'feedback' afforded by the slower pace and the trainer's scaffolding, the clinicians received deep layers of information about the trainers' way of scoping which they probably never would obtain from entirely disconnected descriptions (no matter how rich these descriptions may be). In this way, the slow-paced case-training rendered it possible to bypass the 'Danish scoping logic' and initiate the refinement of the clinicians' scoping habits.

DISCUSSION

The aim of this study was to explore 1) the habitual constrains and possibilities (*habitus*) of experienced clinicians who participated in a Danish faculty development program and 2) the pedagogical investments and teaching methods among experienced trainers in their endeavor to change old habits in experienced clinicians. We found that Danish clinicians' habitus was characterized by tacit skills, the perception of CSPY as routine work with lower status than surgery, and a strong skepticism to corrective advices and feedback. We also found that expert trainers were able to deal with these constraints when being occupied with building relations, using intellectualization and academization of skills and competences, positioning themselves as authoritarian role-models, and scaffolding the clinicians' practical sense of scoping.

Limitations

The design of this study was a short-term ethnographic field work and in-depth interviews during a period of six months, and so the design did not include a longitudinal follow-up investigation. Thus we are not able to explore the long-term effects of the TCT program and the clinicians' ability to employ their renewed habits in the daily workplace environments. A recent study on faculty development in surgical specialties suggested that "long-term interventions provide more sustained change in learning, transfer of skills to the educational environment and long-term organisational change" (Khan et al. 2013). Our study substantiates why continual and longitudinal training is needed since the results emphasize that the clinicians' responsiveness to training is dependent on their already incorporated habitus. According to the theoretical framework of this study, habitus is to be understood as a socially constructed practical sense and a practical identity that is shared with similarly disposed groups of persons. This means that changing a clinician's habitus include organizational change. So an important question remains to be answered: Are the skills and 'buy-ins' developed during the TCT-program

maintained and transformed into a sustained habitual change when the clinicians' renewed habits are no longer supported by the context of the program and close interactions with the trainers? Unfortunately, this question cannot be answered within the scope of this study.

The conceptual framework of our study was mainly based on sociological concepts which were applied in the third step of the data analysis: the theoretical reading of the most frequent appearing codes in the data material. However, the deductive codes in the first step of the data analysis were constructed on the basis of two common educational strategies in medical education: deliberate practices and apprenticeship learning. We could have integrated these two theoretical concepts more explicitly in a theoretical discussion of habitus and illusio, and this would most likely have enriched and nuanced the interpretations of data and provided the study with a broader range of insights. The aim of this study was not to develop an integrated theoretical framework for investigating habitual constrains and possibilities involved in experienced clinicians' learning of new skills, but we realize that such an endeavor would have deepened the reading of the qualitative data.

Finally, the distribution of male and female participants in the study was not representative of the Danish population of clinicians within colonoscopy, but was a result of an internal selection process in Central Denmark Region based on criteria such as years of experience and position in the department, and not representativeness. The gender aspect was not included in the analysis of our data, and this may have omitted interesting insights in the study questions.

Clinical skills are socially constructed

Previous studies seem to regard surgical competencies as individual properties that can be described independently of organizational structures and social interactions (Ericsson 2011; Endsley et al., 1999; Patel et al., 2002; Schulz et al., 2013; Wright et al., 2004;). These studies might promote the assumption that clinical expertise can be trained individually or under idealized conditions detached from the social

context and cultural environment of the real-world context. However, according to de Cossart and Fish (2005), the actual 'doing' in surgery is only the 10% tip of the iceberg of professional practice: "The visible performance is underpinned by a range of invisible but highly significant resources and underlying drivers, the foundation of which is values" (2005, p. 23). Accordingly, we suggest that the clinicians' scoping habits are not individual patterns of habits but must be understood as shared habits closely tied to the environment and the culture in which the clinicians practice on a daily basis. The practice of colonoscopy becomes relevant and meaningful to the clinicians on the backdrop of shared - underlying and tacit - 'logics' and it is these logics that guide their ways of committing and investing themselves in their practice (Crossley, 2001, 2005). Due to the reproduced and confirmed logics of practice in their daily work environment, the clinicians are almost automatically 'pulled towards' a certain way of scoping and thus caught up in a particular illusio. In the case of the Danish clinicians in this study, the shared logics of practice seem to constrain the clinicians' opportunities to learn new skills and approaches to the procedure. The clinicians' habitus work as a barrier to reach expertise, because their locally and socially accepted level of performance seems to be "arrested in its effortless automated form" (Ericsson, 2007, p. 15). Thus our study approves Ericsson's case that "the key challenge for aspiring expert performers is to avoid the arrested development associated with automaticity and to acquire cognitive skills to support continued learning and improvement" (1998, p.90). In the following section we discuss the manners in which the professional trainer may 'release' the clinicians' 'arrested' level of performance.

The professional trainer: medical expert and master craftsman

Studies on colonoscopy training often focus on listing the technical and cognitive skills that are required by younger trainees in order to perform colonoscopy safely, effectively and comfortably (Haycock et al., 2010; Koch et al., 2012; Mahmood and Darzi, 2004; Sedlack et al., 2012). These studies pay less attention to the way the trainees' habitus influence the training process and therefore risk advancing

the presupposition that the trainees (and certainly experienced trainees) can be regarded as 'clean sheets' that straightforwardly may be taught new technical skills. We show that the scoping habits of the trainees are influenced by a tacit and unreflected 'rationale' developed through past practical experiences, which affect the trainee's responsiveness to training. This suggests that trainers and faculty developers may need to consider the professional identity and habitual background of the clinicians, and that the pedagogical investments of the trainers should include not only the development of technical skills, but also relation-building and establishing authority both as a medical expert and a professional trainer (Ramani and Leinster, 2008). In short, our study underpins the need for a learner-centered approach to teaching (Gibbs and Coffey, 2004) especially when the learner is an experienced clinician.

Studies on teaching and learning in clinical environments suggest that efficient training is characterized by learners investing themselves in the training by focusing on explicit performance goals, thus arguing for a training practice in which learners primarily has an instrumental and rational approach to training (Coderre et al., 2010; Ericsson 2011; Ramani and Leinster, 2008). For example, Ericsson's concept of deliberate practice (Ericsson, 2011), in particular the formulation of clear and appropriate goals for mastering articulated aspects of practice, is acknowledged as a necessary part of performance enhancement (Ramani and Leinster, 2008; Coderre et al., 2010). Goal-setting is undoubtedly important to learning and the motivation to learn. However, these studies seem to pay less attention to a more bodily and less explicit aspect of creating buy-in and investments in the training. Our study emphasizes the importance of accompanying goal-setting with scaffolding the experienced clinicians' practical sense. By scaffolding the clinicians' sensing of practice the trainers gradually shape the bodily felt sense of the commitment and motivation in the clinicians, and by doing so the trainers attract the clinicians towards the desired scoping habits of the trainers, i.e. the clinicians get a sense of the trainers' illusio. This insight in teaching and learning clinical skills is rare in the psychological inspired medical education literature (Ramani and Leinster, 2008; de Cossart and Fish, 2005), and so a sociological conceptual

framework including *habitus* and *illusio* (Crossley, 2001, 2005) such as the conceptual framework of this study, seems appropriate in order to explore the social and bodily understructure of learner-centered approach to training of experienced clinicians. In addition to Crossley's work, the sociologist Richard Sennett (2008) explored the sociology of learning, skill development, motivation, commitment, and judgement in professional domains such as for example medicine, architecture, engineering, music, and gastronomy. In his book "The Craftsman", Sennett claimed that expert trainers or "master craftsmen" are characterized by their "sociable" (2008, p. 246) and learner-centered approach to their apprentices. But at the same time, Sennett suggested that master craftsmen are capable of setting a standard and framing the "standards of good work" (2008, p. 249) in language and in actions that makes the standards of a particular craftsmanship such as for instance colonoscopy transparent and graspable to the apprentices. In the quotation below, Sennett described the pedagogic characteristic of a "workshop", i.e. a workshop is a small face-to-face place of work such as for example an operating theatre or an outpatient clinic:

"In craftsmanship there must be a superior who sets standards and who trains. In the workshop, inequalities of skill and experience become face-to-face issues. The successful workshop will establish legitimate authority in the flesh, not in rights or duties set down on paper" (Sennett, 2008, p. 54).

Sennett suggested that being learner-centered and a legitimate authority at the same time is not a contradiction but a precondition for being a good teacher. On the basis of our findings in this study, we may add to Sennett's suggestion that a precondition for creating buy-in among experienced clinicians is a trainer that positions himself/herself as a leaner-centered authority in the flesh. The trainers in the workshops that we studied seem to "legitimate authority in the flesh", because they manifest their superiority of scoping skills in face-to-face interactions during case trainings, and as role-models they show a more advanced level of reflection, argumentation, and conscious competence. From the perspective of the experienced clinicians the face-to-face interaction with the authority seemed to

change their scoping conditions. The interaction stirred up relations of power and modified the experienced clinicians' practical sense and identity – and in the end changed the shared logic of practice among the Danish clinicians during this particular program.

This suggests that continued training and changing old habits of experienced colonoscopists and probably other medical experts requires trainers that are capable of practicing what they teach, and exemplify this in face-to-face interactions with the experienced clinicians.

CONCLUSION

Hitherto a few studies have been conducted on experienced colonoscopists' continued training (Coderre et al., 2010; Jorgensen et al., 2013; Valori et al., 2012;) and in particular on how trainers and faculty developers may overcome old and congealed habits of *experienced* clinicians, unpack their tacit and underlying logics of practice and create buy-in to new ways of doing and understanding practice. Old habits die hard, but on the basis of this study we may suggest that trainers and faculty developers would be able to overcome the experienced clinicians' habitual constrains and ingrained resistance to change when:

- the trainer has a learner-centered approach to teaching, while still standing out as authorities, academic role-models and practical experts in face-to-face interactions with the clinicians,
- the trainer considers, recognizes, and actively engages with the interpretative habits of the clinicians when guiding and arguing for why the clinicians should changes their habits, and
- the trainer encourages the clinicians to slow down and guides them towards sensuous aspects of the trainers' standards of good work and their underlying motivations.

These modest suggestions may help trainers and faculty developers in establishing learning environments and training contexts with *a logic of practice* that promote learning and habit refinement by emphasizing the importance of creating buy-in that operates at the most pre-reflective (or we might say: intuitive) level of the experienced clinicians' aspirations and in this way bypasses old habits.

Acknowledgements

We wish to thank the clinicians and the trainers who kindly gave their time to participate in this study and shared their experiences with us. In particular, we wish to thank Dr. Roland Valori and Dr. John Anderson (Gloucestershire Royal Hospital, UK, and the English NHS) and Dr. Knud Thygesen and Prof. Søren Laurberg, Aarhus University Hospital, DK, for providing the unique access to the TCT program and its participants. Finally, we wish to thank Dr. Thomas Møller Jensen, The regional Hospital in Horsens, DK, for his strong commitment in hosting the TCT program.

The study was funded by Central Region Denmark.

Reference List

1. Coderre, S., Anderson, J., Rostom, A., & McLaughlin, K. (2010). Training the endoscopy trainer: From general principles to specific concepts. Canadian Journal of Gastroenterology, 24, 700-704.
2. Colley, H. (2012). Not learning in the workplace: Austerity and the shattering of "Illusio" in public service. Journal of Workplace Learning, 24, 317-337.
3. Crossley, N. (2001). The Social Body – Habit, identity, and desire. (London: Sage Publications)
4. Crossley, N. (2004). The Circuit Trainer's Habitus: Reflexive Body Techniques and the Sociality of the Workout. Body & Society, 10, 37-69.
5. Crossley, N. (2005). Key concepts in critical social theory. (London: Sage publication)
6. de Cossart, L. & Fish, D. (2005). Cultivating a thinking surgeon. New perspectives on clinical teaching, learning and assessment. (Nr Shrewsbury: tfm Publishing)

7. Dreyfus, H. L. (2001). On the Internet. (London: Routledge)
8. Duvivier, R., van Dalen, J., Muijtjens, A., Moulaert, V., van der Vleuten, C., & Scherpbier, A. (2011). The role of deliberate practice in the acquisition of clinical skills. BMC Medical Education, 11, 101. DOI:10.1186/1472-6920-11-101. http://www.biomedcentral.com/1472-6920/11/101
9. Endsley, M.R. and D.B. Kaber (1999), Level of automation effects on performance, situation awareness and workload in a dynamic control task. Ergonomics, 42(3), 462-92.
10. Ericsson, K. A., Krampe, R. T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. Psychological Review, 100, 363-406.
11. Ericsson, K.A. (1998) The Scientific Study of Expert Levels of Performance: general implications for optimal learning and creativity. High Ability Studies, 9 (1), 75-100,
12. Ericsson K.A. (2007). Deliberate practice and the modifiability of body and mind: toward a science of the structure and acquisition of expert and elite performance. International Journal of Sport Psychology 38, 4-34.
13. Ericsson, K. A. (2011). The Surgeon's Expertise. (In H. Fry & R. Kneebone (Eds.) Surgical Education: Theorising an Emerging Domain (pp. 107-121). Dordrecht: Springer)
14. Fiordelli, M., Schulz, P. J., & Caiata Zufferey, M. (2014). Dissonant role perception and paradoxical adjustments: An exploratory study on Medical Residents' collaboration with Senior Doctors and Head Nurses. Advances in Health Sciences Education, 19(3), 311-327.
15. Gavin, D. R., Valori, R. M., Anderson, J. T., Donnelly, M. T., Williams, J. G., & Swarbrick, E. T. (2013). The national colonoscopy audit: A nationwide assessment of the quality and safety of colonoscopy in the UK. Gut, 62, 242-249.
16. Gibbs, G. & Coffey, M. (2004). The Impact Of Training Of University Teachers on their Teaching Skills, their Approach to Teaching and the Approach to Learning of their Students. Active Learning in Higher Education, 5, 87-100.

17. Haycock, A., Koch, A. D., Familiari, P., van Delft, F., Dekker, E., Petruzziello, L. et al. (2010). Training and transfer of colonoscopy skills: a multinational, randomized, blinded, controlled trial of simulator versus bedside training. Gastrointestinal Endoscopy, 71, 298-307.
18. Jorgensen, J. E., Elta, G. H., Stalburg, C. M., Kolars, J. C., Stout, J. M., Korsnes, S. J. et al. (2013). Do breaks in gastroenterology fellow endoscopy training result in a decrement in competency in colonoscopy? Gastrointestinal Endoscopy, 78, 503-509.
19. Khan, N., Khan, M. S., Dasgupta, P., & Ahmed, K. (2013). The surgeon as educator: Fundamentals of faculty training in surgical specialties. BJU International, 111, 171-178.
20. Koch, A. D., Haringsma, J., & Schoon, E. J. (2012). Competence measurement during colonoscopy training: Use of self-assessment of performance measures. American Journal of Gastroenterology, 107, 971-975.
21. Kvale, S. & Brinkmann, S. (2009). InterViews: learning the craft of qualitative research interviewing (Second Edition ed.). (Los Angeles: SAGE Publications)
22. Mahmood, T. & Darzi, A. (2004). The learning curve for a colonoscopy simulator in the absence of any feedback: no feedback, no learning. Surgical Endoscopy, 18, 1224-1230.
23. McGillivray, D., Fearn, R., & McIntosh, A. (2005). Caught up in and by the Beautiful Game. Journal of Sport & Social Issues, 29, 102-123.
24. McIntosh, K. S. (2014). Computer-based virtual reality colonoscopy simulation improves patient-based colonoscopy performance. Canadian journal of gastroenterology & hepatology, 28, 203-206.
25. Musaeus, P. (2012). Korttidsetnografi - hverken blitzkrig eller eksil.(In M.Pedersen, J. Klitmøller, & K. Nielsen (Eds.), Deltagerobservation. En metode til undersøgelse af psykologiske fænomener (pp. 149-160). København: Hans Reitzels Forlag)
26. Patel, V.L., D.R. Kaufman, and J.F. Arocha (2002). Emerging paradigms of cognition in medical decision-making. Journal of Biomedical Informatics, 35(1), p. 52-75.

27. Pink, S. (2009). Doing sensory ethnography. (London: Sage Publications)
28. Ramani, S. & Leinster, S. (2008). AMEE Guide no. 34: teaching in the clinical environment. Medical Teacher, 30, 347-364.
29. Schulz, C.M., et al. (2013), Situation awareness in anesthesia: concept and research. Anesthesiology, 118(3), 729-742.
30. Sedlack, R. E., Shami, V. M., Adler, D. G., Coyle, W. J., DeGregorio, B., Dua, K. S. et al. (2012). Colonoscopy core curriculum. Gastrointestinal Endoscopy, 76, 482-490.
31. Sennett, R. (2008). The Craftsman. (New Haven & London: Yale University Press)
32. Shahidi, N., Ou, G., Telford, J., & Enns, R. (2014). Establishing the learning curve for achieving competency in performing colonoscopy: a systematic review. Gastrointestinal Endoscopy, 80, 410-416.
33. Spradley, J. P. (1980). Participant observation. (Fort Worth: Harcourt Brace College Publishers)
34. Stake, R. E. (1995). The art of case study research. (Thousand Oaks: SAGE Publications)
35. Valori, R. (2012). Quality Improvements in Endoscopy in England. Techniques in Gastrointestinal Endoscopy, 14, 63-72.
36. Valori, R., Rey, J. F., Atkin, W. S., Bretthauer, M., Senore, C., Hoff, G. et al. (2012). European guidelines for quality assurance in colorectal cancer screening and diagnosis. First Edition. Quality assurance in endoscopy in colorectal cancer screening and diagnosis. Endoscopy, 44(SUPPL3), SE88-SE105.
37. Valori, R., Sint Nicolaas, J., & De Jonge, V. (2010). Quality assurance of endoscopy in colorectal cancer screening. Best Practice and Research: Clinical Gastroenterology, 24, 451-464.
38. van Manen, M. (1995). On the Epistemology of Reflective Practice. Teachers and Teaching, 1, 33-50.
39. Wells, C. W., Inglis, S., & Barton, R. (2009). Trainees in gastroenterology views on teaching in clinical gastroenterology and endoscopy. Medical Teacher, 31, 138-144.

40. Wenger, E. (1998). Communities of practice. Learning, meaning, and identity. (Cambridge: Cambridge University Press)
41. Wenger, E., McDermott, R., & Snyder, W. M. (2002). Cultivating communities of practice. (Boston: Harvard Business School Press)
42. Wright, M.C., J.M. Taekman, and M.R. Endsley (2004). Objective measures of situation awareness in a simulated medical environment. Quality and Safety in Healthcare, 13, 65-71.