General introduction
Changes in healthcare demands and related changes in thinking about training healthcare professionals have inspired innovation of medical education. For the people who participate in the current practice of medical education this means that they have to deal with a variety of changes. The ones who have started to use new methods in specialty training include trainees and registered specialists working in training departments. Some of them are in charge of bringing about the intended innovations too. The subject of interest in this thesis is how the people who participate in medical specialty training deal with innovations in this training.

This introduction first sketches roughly the changes in the fields of healthcare and medical education of the recent past. It continues with an overview of resulting innovations in specialty training and current insight in their implications for training. This overview makes clear that there is a need for better understanding how to approach innovating specialty training. The introduction concludes with an outline of the studies that were performed in order to add to this understanding.

The term innovation is used frequently in this thesis. There is not one exact definition of the concept because of the differing terminology in various fields and overlap with the concept of change. In this thesis, the term innovation in medical education indicates something new or changed to training departments, which requires certain intended behaviour of the people involved. Moreover, it typically includes new concrete methods and tangible tools. For example, workplace-based assessment is considered an innovation in this thesis, because it is a new concept in specialty training for which behavioural change of trainees and specialists was needed to enact it in practice, including observation of performance and registering feedback on forms. It comprised new methods like organized observation and specific feedback directly afterwards, and new tools to support that like the mini-clinical evaluation exercise (mini-CEX) form for structuring and registering feedback. The word change in this thesis usually indicates matters that are less intentional than innovations or do not include tangible tools. Terminology regarding medical education and the people involved is diverse as well. Table 1 presents an overview of widely used terms across the world.
Table 1. Terminology regarding medical education*

<table>
<thead>
<tr>
<th>Stage in medical trajectory</th>
<th>Terminology in the Netherlands</th>
<th>Terminology in the UK</th>
<th>Terminology in the USA</th>
</tr>
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<tbody>
<tr>
<td>Phase following undergraduate training</td>
<td>Postgraduate medical education</td>
<td>Postgraduate medical education</td>
<td>Graduate medical education</td>
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<td></td>
<td>Specialty training</td>
<td>Specialty training</td>
<td>Specialty registrar training</td>
</tr>
<tr>
<td>Trainee within specialty training</td>
<td>Specialist trainee</td>
<td>Specialist registrar</td>
<td>Resident</td>
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<tr>
<td>Registered medical specialist</td>
<td>Medical specialist</td>
<td>Hospital consultant</td>
<td>Attending physician</td>
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<tr>
<td>Person in charge of specialty training</td>
<td>Specialty trainer</td>
<td>Dean</td>
<td>Program director</td>
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<td></td>
<td>Lead consultant</td>
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* Table adapted with author’s permission from Westerman, M. Mind the gap. 2012

Changes in healthcare and medical education

Undergraduate medical education of the past century was organized in academic curricula with a firm ground in the basic sciences. Meanwhile, postgraduate medical education consisted almost exclusively of unstructured on the job learning in an apprenticeship model. These characteristics fitted the state of science, practice and societal demands of that time. Yet, healthcare has continued to increase in complexity, related to developments like endless possibilities in diagnostic and treatment options, and ageing of populations leading to a large share of patients with multi-morbidity. This has been accompanied by sub specialization of patient care and rising healthcare costs. At the same time, societal demand has risen for accountability of these costs and of performance of physicians. Also, apart from having excellent medical or surgical skills, patients expect from their doctors that they communicate clearly, organize care adequately, and possess other general qualities like these.

These developments ask for advancement of medical education. Undergraduate medical curricula have become more student-centred including problem-based learning approaches that are directed at active learning and integrating basic and clinical sciences. The current requirements for postgraduate medical education include that it needs to prepare physicians in such a way that they are competent to meet current and future demands, while at the same time delivering good, safe and accountable care. As a solution to do so, the contemporary approach to specialty
training is competency based and outcome oriented. This includes the use of sets of attributes that trainees should develop during training as a basis for designing training programs. It also means that demonstrated performance of trainees is increasingly considered important for certification rather than time in training only.

**Contemporary innovations in specialty training and their implications**

The above described developments in medical education have been accompanied by a variety of innovative applications intended to support safe and competency based specialty training and assessment of trainees. One example is the structured practicing of skills of in simulated settings, before trainees are allowed to perform those in practice, called simulation-based training. Also, a variety of new assessment methods and tools has been developed for both formative and summative assessment of learners. Well known is the example of workplace-based assessment (WBA), meaning the assessment of actual performance of trainees at work, of which there are several variations. It can concern single patient encounters of a trainee observed by a registered specialist or senior trainee, followed by immediate feedback. Widely used tools for this variation are the mini-clinical evaluation exercise (mini-CEX) and the objective structured assessment of technical skill (OSATS). Another variation of WBA is collecting ratings and comments of various people that a trainee has worked with in a certain time period, typically called multi-source feedback (MSF). Furthermore, a tangible new tool now used in most training programs is the portfolio. This is a collection, now usually digital, of evidence of a trainee’s activities and assessments. Portfolios are intended to keep track of trainee development, create an overview to define learning goals and to support overall assessment.

Medical education research about these innovations up until now has mainly focused on the tools and methods, and the extent to which desired effects can be reached by using those. For example, the properties of the mini-CEX have been scrutinized. Also, the educational effects of portfolios and various types of workplace based assessment have been looked into thoroughly. Very generally speaking, all of these tools have been found to be able to support learning and assessment in specialty training. However, it has become clear that the effects of the innovations depend largely on how they are used by people in daily practice.
of training. Experience with mini-CEXs illustrates that an innovation does not automatically come into play fully. This tool is often used as a check-box and regarded an administrative procedure that does not contribute to training, while the extra task increases workload. Good psychometric properties of mini-CEXs are then merely a theoretical benefit, but not relevant for the contribution to training. It is the way in which supervisors and trainees handle the required feedback that makes them contributory to learning or not. Thus, innovations for specialty training not only have to be apt themselves. It is important even more so that using the innovations catches on the people who participate in training. This means that innovations have to be introduced into practice in a way that enables meaningful use. This is where the field of medical education meets the field of change management.

Different aspects of innovation and change processes have since long received interest in various fields, including business organization and management, sociology and economics, and healthcare. In business, the main focus is on how people in charge of change should lead these processes to do this effectively and bring about intended effects. Sociologic and economic interest has since long been about how innovations diffuse through groups of people, and when people adopt the use of a novelty. The research of these fields combined is extensive and diverse, and more detailed discussion of these fields is beyond the scope of this introduction. In the field possibly most closely related to medical education, being that of healthcare, implementation science is growing with the aim to understand complex issues like implementing evidence-based guidelines for optimizing quality of care. In medical education research, innovation processes have received some attention as well. They mainly concern undergraduate educational change. Reflections on curriculum changes (for instance into using team-based learning) aimed at uncovering elements important for successful change are most abundant, and have led to conclusions that most issues known from the above discussed fields are important for medical education innovation as well. This means that issues related to the people involved, the innovation, the context and the process are recognized as important for medical education innovation. For instance, elements like strong leadership, expertise, buy-in, fit with practice, approaching the process in phases,
and ensuring adequate time have been acknowledged as important for successful curriculum innovation.\textsuperscript{28-30} Also, there is a vast body of reports that are based on one of these elements, including the person in charge of curricular change\textsuperscript{31}, or on specific qualities that are deemed important for change like leadership qualities\textsuperscript{32,33}, communication skills\textsuperscript{34} or societal and organizational culture.\textsuperscript{4}

Compared to the interest in innovating undergraduate medical education, processes of innovating postgraduate medical education have remained underexposed. However, innovating undergraduate and postgraduate training cannot be expected to be similar, since specialty training innovation involves the dynamic area of the practice of patient care. The existing reports on postgraduate reforms are mainly thoughtful reflections or advice.\textsuperscript{21;35-39} Empiric studies about innovating postgraduate medical education are still scant\textsuperscript{5;40-42} and theory based insight into innovation processes has only just started to form.\textsuperscript{41-45} Thus, while it is clear that innovating specialty training is challenging, it is still largely unclear how innovations in this area should be dealt with by the people in daily practice, in order to contribute to training. Therefore, insight is needed into how the people who participate in medical specialty training deal with innovations. This kind of knowledge can potentially support approaching innovation of specialty training in such a way that it leads to high quality training, does not waste precious energy of all, and ultimately leads to excellent patient care.

**Aim of this thesis**

The aim of this thesis is to contribute to the knowledge about innovating specialty training. It uses knowledge about innovation processes from other fields as a basis, and focuses on the experiences of the people who participate in medical specialty training: residency program directors, consultants, and residents. The overall question of this thesis is: how do people who participate in medical specialty training deal with innovations in this training?

We approach this question by first looking into three distinct aspects that are involved with innovation, respectively: approaches of the people in charge of training for bringing about change, the effects in practice that using an innovation brings about and the perceptions of the people involved with training regarding these effects. These elements are combined in a fourth study of an innovation process,
Chapter 1

looking into the mutual influence of implementation approach and arising effects in an innovation process.

Starting off with the people in charge of programmatic changes in actual specialty training, chapter 2 addresses the question how program directors approach bringing about change at a training department. Specifically, it concerns the senior consultant with this responsibility for a department, designated in this chapter by the term ‘lead consultant’. An exploratory qualitative study using semi-structured interviews is described, for which concepts relating to change management from business and social psychology were used as a basis. The specific research questions of this study were: which approaches to changes in specialty training are used by lead consultants? And what factors influence these approaches?

Chapter 3 then looks into how the people involved with daily practice of specialty training feel they are affected by an innovation. It describes a study among (lead) consultants and trainees as users of workplace-based assessment (WBA), which was studied as a case of an innovation in specialty training. In order to take into account that their perceptions are not necessarily limited to the strictly education-related domain, the study design was informed by sociologic theory on diffusion of innovation. It sought to establish what types of effects of WBA are perceived by consultants and trainees in the course of using WBA in the clinical workplace.

Chapter 4 looks further into a finding from the previous chapter by focussing on the distinct perceptions that users of the same innovation can have about the effects of using it. This was studied using Q methodology, which combines aspects of qualitative and quantitative approaches for systematic investigation of perceptions of trainees and consultants across various departments. The research question was: What perceptions of the effects of using WBA exist among its users?

Combining the elements from the preceding chapters, chapter 5 looks into how the effects of an innovation and of the approach to its implementation are intertwined. The innovation in this study is the concept of transparency and competition in
specialty training, aimed at stimulating accountability and quality of training. As a case in which this innovation was introduced, a Dutch national project was studied. This was done using a theory-driven methodology based on theory from implementation science. Qualitative analysis of project generated documents and stakeholder insight was conducted guided by the question: what are the effects of implementing transparency and competition in specialty training, and how are these effects influenced by the implementation approach?

Finally, in chapter 6 the main findings from this thesis are discussed, and accordingly a new conceptualization of innovating medical specialty training is proposed. Furthermore, reflections on the research in this thesis are provided, including its strengths and limitations and implications for further research and practice.
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General introduction


Chapter 1


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