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Exploring the maturation of medical educators and their beliefs about teaching and learning: the value of a personal educational mission

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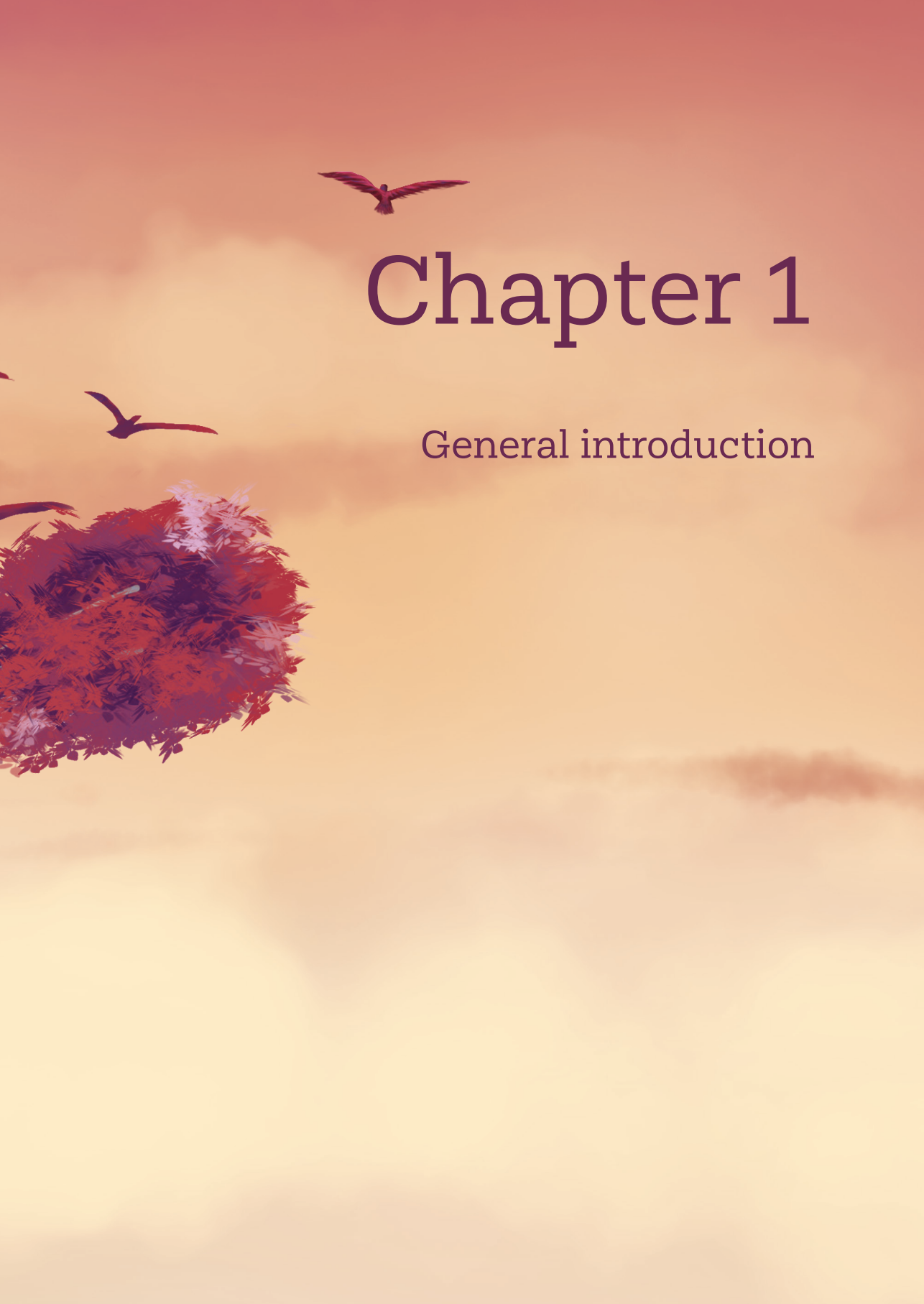
‘Education is the most
powerful weapon which
you can use to
change the world’

- Nelson Mandela -



Chapter 1

General introduction

GENERAL INTRODUCTION

Learning-centred education has gained ground in recent decades and is widely implemented in medical schools around the world.[1] An important reason for this innovation is that learning-centred education is associated with high-quality student learning.[2-11] A core characteristic of learning-centred education is its focus on facilitating student learning and development, as opposed to teaching-centred education with a mere focus on the structure of the content and its transmission by the teacher.[e.g.1,12-16] This requires a different role from the medical educators responsible for the teaching: they need to act as facilitators of students' learning processes rather than focusing only on the transfer of factual knowledge.

To properly fulfil this role, educators need to become aware of their beliefs about teaching and learning, as beliefs are important drivers of behaviour.[e.g.15-22] Indeed, any innovation in which the beliefs of educators responsible for its implementation do not align with the premise behind the innovation, is doomed to fail.[23,24] However, we know that a substantial number of medical educators still hold beliefs about teaching and learning that are inconsistent with the learning-centred education context in which they work.[e.g.25,26] To effectively encourage learning-centred teaching behaviours, we need to understand which factors influence educators' beliefs about the teaching and learning process. One of the factors associated with beliefs about teaching and learning is what educators believe about being a teach*er*.[27,28] For example, the more personal views educators hold about themselves as teachers, such as their motivation or enjoyment as a teacher, are suggested to be influential to their beliefs about teaching and learning. The studies which suggest a relationship between beliefs about teaching and learning, and beliefs about being a teacher were carried out in higher education[27] and teacher education[28] contexts. Therefore, to determine whether such a relationship also exists in the medical education context, we will explore sequentially medical educators' beliefs about teaching and learning, and their beliefs about being a teacher, and subsequently relate these two areas of inquiry to each other. To prevent confusion between the two areas of inquiry we decided to reserve the term 'beliefs' for beliefs about teaching and learning, and to describe beliefs about being a teacher as 'perspectives on being a teacher.' We consider the terms 'beliefs' and 'perspectives' to be similar in meaning. If we can demonstrate a relationship between beliefs about teaching and learning, and perspectives on being a teacher, then it is useful to investigate whether educators' perspectives on being a teacher are fixed in time, or rather can develop over time towards a more explicit focus on supporting the student and their development.

To summarise, this study focuses on how medical educators working in learning-centred educational contexts can develop their perspectives on being a teacher, and how these perspectives relate to their beliefs about teaching and learning. This will provide insights into the development of medical educators, and may uncover important tools and strategies to facilitate faculty development in medical schools, benefitting the education of future health care professionals.

To give an introduction into the research of beliefs about teaching and learning, and perspectives on being a teacher, we will first define and describe terms commonly used in this research. This is followed by an overview of current insights into beliefs about teaching and learning including existing classifications of these beliefs. Subsequently, we will further elaborate on what is known about perspectives on being a teacher. We will describe a theoretical model, developed previously in teacher education, which we used to explore educators' perspectives on being a teacher. According to the model, beliefs are largely influenced by identity and mission as a teacher. However, little is known in the medical education research literature about the relationship between beliefs on the one hand and identity and mission on the other. This empirical gap is subsequently also addressed in our work: how medical educators' beliefs about teaching and learning are related to their educational identity and mission. Finally, since little is known about the development of medical educators' perspectives on being a teacher over time, we will discuss the need to increase our understanding of how educators develop their perspectives on being a teacher, to help promote the maturation of educators towards more learning-centred beliefs and behaviours.

Description of terms

Medical educator

A medical educator, according to the Glossary of Medical Education Terms, is a professional who focuses on the educational process necessary to transform students into physicians.[29] The term often refers to professionals who, in addition to teaching, fulfil other educational roles, such as curriculum design and evaluation, educational leadership and innovation, as well as research in education.[30] Since in this study we deliberately selected professionals with long-term teaching experience and multiple educational roles in medical schools, we have adopted the term 'medical educator' to describe the participants in our studies.

Learning-centred education versus teaching-centred education

Learning-centred education, more often referred to as student-centred or learner-centred education, has been defined in various ways.[e.g.1,14,29,31-33] As a starting definition for this research, we have opted for the definition of Bremner,[34] because of its clarity and completeness. It states that learning-centred education is 'a teaching approach in which learners cease to be passive receivers of knowledge and become active participants in their own learning process; learning is contextualised, meaningful, and based, wherever possible, around learners' prior knowledge, needs and interests; finally, learning is dialogic and democratic, and learners have control with regards to what and how they learn.' A learning-centred educational approach is in line with the concepts of self-regulated learning and life-long learning. Small group teaching sessions can be effective in encouraging students to construct their own meaning of the subject matter, and increase their conceptual understanding through active participation and collaboration.[35] Learning-centred education is the opposite of teaching-centred education, in which the teacher determines what is being taught and how it is to be learned. In teaching-centred education, formal lectures are important activities, and the students are more passive recipients of the knowledge presented. In this research we prefer 'learn*ing*-centred' education over 'learn*er*-centred' education since in the discourse on educators' beliefs about teaching and learning several studies emphasise that in learning-centred beliefs the focus is on the *learning* of the learner rather than on the learner themselves.[e.g.16,27,36]

Definition and characteristics of educational beliefs

Beliefs can be defined as 'psychologically held understandings, premises and propositions about the world that are felt to be true.'[20] Although there are still many discussions about the concept of 'educational beliefs,' the following characteristics are generally agreed upon in the educational research literature.[17,20,28,34,37-39] Educational beliefs are generally deeply-rooted through the strong influence of teachers' own (early) experiences as learners. They are resistant to change, even though change over time is achievable in response to significant experiences. Educational beliefs can sometimes be consciously present in the 'foreground,' but can also be unconsciously in the 'background' at other times. They are generally seen as key factors in influencing teaching practice, but nevertheless the relationships between beliefs and practices are complex and there are many cases where educators' beliefs do not match their practice. Educators' educational beliefs can concern all areas which are relevant to education. In this research we focus on educators' beliefs about teaching and learning, and their beliefs about being a teacher, the latter of which we refer to as 'perspectives on being a teacher.'

Beliefs about teaching and learning

Beliefs versus conceptions

Within the higher education research literature, 'beliefs about teaching and learning' and 'conceptions of teaching and learning' are the most common terms used to describe ideas or convictions that educators hold about teaching, learning, and knowledge. There is an overlap in how these two terms are described in the literature.[12] We have chosen the term beliefs about teaching and learning as the basis for this research for the following reasons. First, the two models that we use in our research both use the term beliefs rather than conceptions.[16,28] Second, studies that use the term (change of) beliefs more often emphasise the importance of affect and emotion in the process of teaching and learning[e.g.39,40] than studies that use the term conceptions. We anticipate that, in addition to cognitive aspects, affective aspects are indeed significant in the convictions that medical educators hold about teaching and learning, and aim to explicitly explore these affective aspects.

Beliefs about teaching and learning in higher education research literature

University educators' beliefs about teaching and learning have been the subject of many studies over the past three decades.[2-5,11,12,15,16,23,27,39,41-50] Most studies have in common that they consistently (though not uniformly: Pratt[47] is an exception) distinguish between teaching-centred and learning-centred beliefs. Learning-centred beliefs are also described as student-centred or learn*er*-centred beliefs, and teaching-centred beliefs as teach*er*-centred beliefs. The description in Samuelowicz & Bain's 1992 study[15] clearly summarises the common findings and illustrates the distinction between teaching-centred and learning-centred beliefs which aligns well with the definition of learning-centred education *versus* teaching-centred education that we provided. They state that educators with teaching-centred beliefs view teaching as a one-way transmission of content information and believe that the content, by which is meant the knowledge, skills and attitude students need to acquire, is the content transmitted by the teacher. They see knowledge as 'factual' and as obtained from outside, and do not focus on the direct interaction between the content and the student (see Figure 1.1.A). In addition, they express learning outcomes in quantitative terms (a student will know more), do not take into account the students' pre-existing conceptions, and see learning as oriented towards the content of a course. In contrast, educators with learning-centred beliefs view teaching as an activity aimed at changing students' beliefs and conceptual understandings through a reciprocal teacher-student interaction to negotiate meaning. They see knowledge as constructed and personalised through experience, and are convinced that their

activities should enable students to construct their own meaning of the content and develop independent creative thinking (see Figure 1.1.B). In addition, they express learning outcomes in qualitative terms (a student will know differently, meaning gain new understandings), believe students' pre-existing beliefs should be the starting point of an interactive process of learning and teaching, and see learning as oriented towards the reality of the profession.

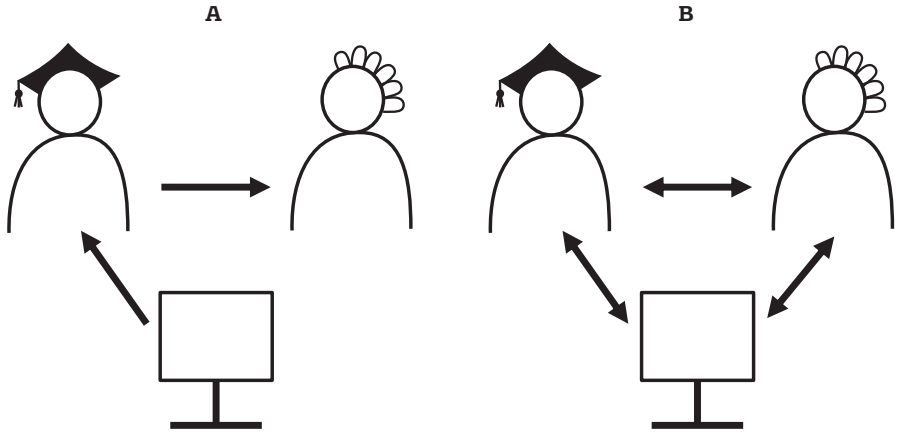


Figure 1.1. The relationship between teacher, student, and content, for teaching-centred beliefs (A) and learning-centred beliefs (B).

Learning-centred beliefs and their effect on student learning

Multiple studies show that educators with learning-centred beliefs appear to make choices in their teaching practice that lead to deeper learning among students.[3-6,9-11,51] This is a *direct empirical* argument for why learning-centred beliefs are preferable in contemporary education. Other studies also provide an *indirect empirical* argument for why learning-centred beliefs lead to better quality learning among students. This is related to the way the beliefs about teaching and learning are categorised. Learning-centred beliefs are consistently viewed as more elaborate and representing a broader understanding of teaching than teaching-centred beliefs.[e.g.12,18,27,36,50,52] For example, while educators with teaching-centred beliefs express the desired learning outcomes in quantitative terms rather than qualitative ones, educators with learning-centred beliefs are aware of both perspectives, and experience the quantitative outcome not so much as wrong but as incomplete. Thus, the indirect empirical argument is that educators with learning-centred beliefs are not only aware of the relevance of the content, but also and above all focus on their students' learning when designing and implementing teaching/learning activities. This increases

the likelihood of a deeper quality of student learning. In contrast, educators with teaching-centred beliefs focus only on the content and are less aware of the student's learning process. In addition to the two arguments described above, Schweisfurth[32] provides two further arguments for why learning-centred beliefs are preferred in contemporary education. The first is an *economic* argument that states that students must develop higher-order skills such as critical thinking, flexibility and creativity in order to become and remain as competitive as possible in an ever-changing world. The second is an *emancipatory* argument that states that learning-centred education is a way of reducing the traditional power distance between teacher and student and thus contributes to a more equal, democratic and diverse society. In our view, both additional arguments are specifically relevant in the medical education context: the fast-changing and expanding medical scientific knowledge and availability of the internet and artificial intelligence as novel tools and sources of information demand that students develop these higher-order skills. Moreover, through a more equal relationship between teacher and student, a core competence such as collaboration can possibly be promoted, and in parallel also contribute to the development of a more equal and collaborative doctor-patient relationship.

Beliefs about teaching and learning in the medical education research literature

Studies exploring medical educators' beliefs about teaching and learning are limited.[14,19,26,48,53-56] Moreover, most of these studies were not specifically executed in learning-centred education context. One of the few studies which explored medical educators' beliefs about teaching and learning in learning-centred curricula is that of Jacobs et al.[14,56] who developed the 'COLT' (Conceptions Of Learning and Teaching) questionnaire. The COLT represents a novel, validated questionnaire for measuring educators' conceptions of learning and teaching in a learning-centred medical education context, and includes a 'teaching-centredness' scale. However, this instrument is less suitable for obtaining a more detailed understanding of the content of learning-centred beliefs. In addition, the eight items measuring teaching-centredness are all cognitive, thus providing no further insights into affective aspects of beliefs, which we expect to be highly relevant. Therefore we aimed to explore the beliefs about teaching and learning of medical educators working within a learning-centred education context in a further qualitative study.

Classifications of beliefs about teaching and learning

The studies of university educators' beliefs about teaching and learning have yielded an abundance of information about how educators conceptualise teaching. However, the ways in which the beliefs were determined and described are very diverse, making it difficult to compare the studies and their reported results. Moreover, there is a need for a classification that not only differentiates between teaching-centred *versus* learning-centred beliefs, but also provides a more detailed and sophisticated measurement scale to determine more precisely the degree of teaching-centredness and learning-centredness.

Samuelowicz & Bain's extended 2001 framework[16] maintained the richness of global descriptions together with a systematic, comprehensive comparison of descriptions of categories of beliefs identified by researchers. The framework consists of a matrix and describes teaching beliefs in terms of belief orientations and belief dimensions (for convenience, we have provided the framework in Table 1.1). A belief orientation represents a global, composite set of beliefs about teaching, learning, and knowledge. In the framework, there are seven different belief orientations, indicated in the columns in the matrix, ranging from teaching-centred to learning-centred. These seven belief orientations are defined by nine belief dimensions, indicated in the rows in the matrix. Each dimension represents a different aspect of the belief orientations regarding teaching, learning, and knowledge. Within each dimension two to four beliefs can be distinguished. For example, the four beliefs listed within the dimension 'Teacher-student interaction' are: 'one-way from teacher to students,' 'two-way to maintain students' attention,' 'two-way to ensure/clarify understanding,' and 'two-way to negotiate meaning.' These beliefs are ordered on a continuum from teaching-centred to learning-centred.

Table 1.1. Samuelowicz & Bain Framework.[16]

Dimensions		Teaching- centred orientations					
		I. Imparting information		II. Transmitting structured knowledge		III. Providing and facilitating understanding	
1	Desired learning outcomes	Recall of atomised information	A	Reproductive understanding	A/b	Reproductive understanding	A/b
2	Expected use of knowledge	Within subject	A	Within subject for future use	A/b	Within subject for future use	A/b
3	Responsibility for organising or transforming knowledge	Teacher	A	Teacher	A	Teacher shows how knowledge can be used	A/b
4	Nature of knowledge	Externally constructed	A	Externally constructed	A	Externally constructed	A
5	Students' existing conceptions	Not taken into account	A	Not taken into account	A	Not taken into account	A
6	Teacher- student interaction	One-way; Teacher → students	A	Two-way to maintain students' attention	A/b	Two-way to ensure/ clarify understanding	B/a
7	Control of content	Teacher	A	Teacher	A	Teacher	A
8	Professional development	Not stressed	A	Not stressed	A	Not stressed	A
9	Interest and motivation	Teachers'	A	Teachers'	A	Teachers'	A

We considered two other classifications developed within higher education contexts to explore medical educators' beliefs about teaching and learning. The first[57] differentiates three belief orientations: teaching-centred, intermediate, and learning-centred. However, this classification is not based on a fixed set of dimensions, as a result of which it does not provide details about the way in which educators' beliefs have been classified. Therefore, this classification is less useful as an analytical tool. The other classification we considered[58] distinguishes ten different dimensions of beliefs about teaching, learning, and knowledge, structured into four groups. However, this classification only differentiates two belief orientations: teaching-centred and learning-

	Learning- centred orientations							
	IV. Helping student develop expertise		V. Preventing misunderstanding		VI. Negotiating understanding		VII. Encouraging knowledge creation	
	Change in ways of thinking	B	Change in ways of thinking	B	Change in ways of thinking	B	Change in ways of thinking	B
	Interpretation of reality	B	Interpretation of reality	B	Interpretation of reality	B	Interpretation of reality	B
	Students & Teacher	B/a	Students	B	Students	B	Students	B
	Personalised	B	Personalised	B	Personalised	B	Personalised	B
	Not taken into account	A	Used to prevent common mistakes	B/a	Used as basis for conceptual change	B	Used as basis for conceptual change	B
	Two-way to negotiate meaning	B	Two-way to negotiate meaning	B	Two-way to negotiate meaning	B	Two-way to negotiate meaning	B
	Teacher	A	Teacher	A	Teacher	A	Students	B
	Stressed	B	Stressed	B	Stressed	B	Stressed	B
	Students'	B	Students'	B	Students'	B	Students'	B

centred. This may result in too rough a classification, so that more subtle differences of beliefs about teaching and learning go unnoticed. Thus, to gain more insight into the content and structure of medical educators' beliefs about teaching and learning we decided to adopt the extended 2001 framework of Samuelowicz & Bain[16] as the starting point for our study. This framework is not only comprehensive in its description of both belief dimensions and belief orientations, but it also uniquely incorporates two 'affective' dimensions (see Table 1.1, Dimensions 8 and 9). Even though emotions may be part of any belief dimension, emotions play a more important and explicit role in the affective belief dimensions. One of these is related to interest and motivation,

the other to students' professional development; the latter which we consider particularly important in the context of medical education and which has received much attention in recent medical education literature.[e.g.59-61]

The framework of Samuelowicz & Bain[16] was developed in contexts outside of medical education. Therefore, we aimed to adapt and validate this framework here in the medical education context.

Perspectives on being a teacher

Since there is evidence that a substantial number of educators in medical schools with learning-centred curricula still hold teaching-centred beliefs,[e.g.25,26] we aimed to better understand which factors influence medical educators' beliefs about teaching and learning. A better understanding of these factors may provide clues as to how educators can be supported to develop learning-centred beliefs. One of the potential starting points in the search for influencing factors is to examine the educators' perspectives on being a teacher. The rationale for this premise is given by two studies from different educational contexts, i.e. higher education[27] and teacher education,[28] both of which relate beliefs about teaching and learning to perspectives on being a teacher. Åkerlind[27] explored perspectives on being a university teacher and concludes that 'a focus on academics' experience of teach*ing* separated from their larger experience of being a teach*er* may encourage oversimplification of the phenomenon of university teaching, in particular in terms of academics' underlying intentions when teaching. There is more to the experience of being a teacher than simply teaching.' Within the field of teacher education, Korthagen[28,62] developed a theoretical model which relates and integrates different perspectives on being a teacher, including a teacher's beliefs about teaching and learning. To explore what 'being a teacher' means for medical educators in relation to their beliefs about teaching and learning, we decided to take Korthagen's model (see Figure 1.2) as a starting point for the following reasons. First, the model has a holistic perspective on what it means to be a teacher, and also takes the educational context into account. Second, the model includes a teacher's identity, a concept that has received increasing attention recently within the medical education literature.[e.g.63-65] Third, it includes a teacher's mission, defined as a teacher's source of inspiration and motivation. The concept of the 'underlying intentions' of a teacher[27] seems to be included in this 'mission' concept. By using Korthagen's model as a lens, we aimed to explore the variety of medical educators' perspectives on being a teacher.

We will first explain the model of Korthagen in more detail. Subsequently we will discuss what is known about the relationships between beliefs about teaching and learning, and those perspectives on being a teacher which are particularly relevant to a deeper understanding of beliefs about teaching and learning.

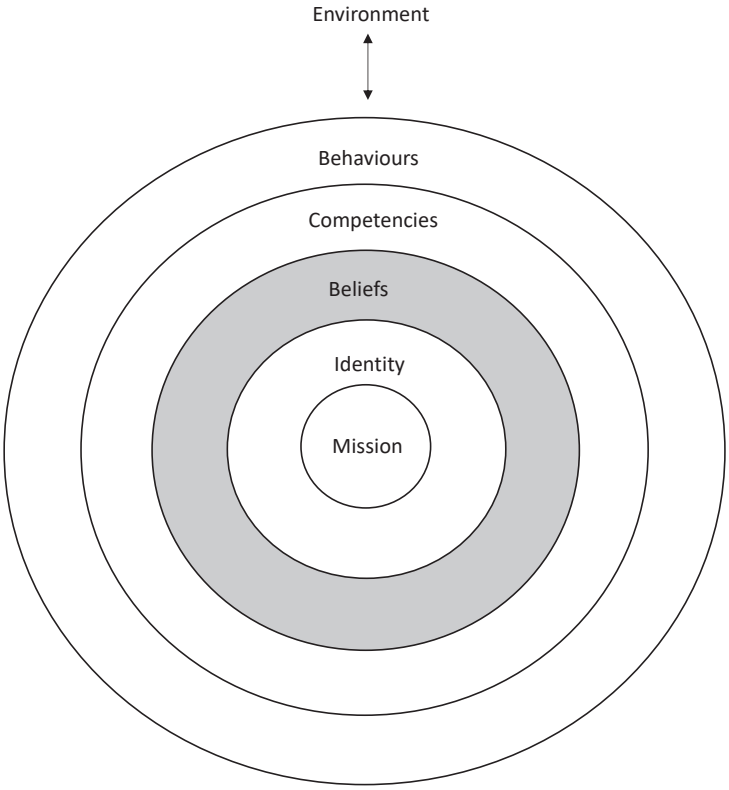


Figure 1.2. Holistic model about perspectives on being a teacher (Korthagen 2004).

Korthagen developed his model as a framework for reflection and development in the context of teacher education. The concentric onion model hypothesises that all levels influence each other. These levels, from periphery to core, are: (1) Environment, (2) Behaviours, (3) Competencies, (4) Beliefs, (5) Identity, and (6) Mission. The *environment*, the most peripheral level, can be defined as the context: external factors (such as the class or school) outside the teacher that influence their perspectives on being a teacher. The *behavioural* level refers to all concrete, observable behaviours or actions of the teacher. The level of *competencies* can be described as the integrated body of knowledge, skills and attitudes of the teacher. It represents a potential for behaviour and is not directly

observable. The level of *beliefs* refers to ideas or convictions teachers hold about teaching, learning, and knowledge. *Identity*, the next level, can be defined as how teachers perceive themselves and their professional roles. Even though the focus is on the 'self,' the perspective is relational, and largely determined by how relationships with significant others are viewed. Finally, the core level of the model, the level of *mission*, is defined as the source of inspiration, or even as what teachers see as their 'personal calling in the world,' which reflects a teacher's deepest purpose and motives. A mission gives meaning to one's professional existence by contributing to others (such as students or colleagues) within a larger context and therefore has a transpersonal characteristic. The question of '*who* I am as a teacher' is related to a teacher's identity, whereas the question of '*why* I teach' is related to a teacher's mission.

According to Korthagen,[28] a teacher's identity takes the form of a 'Gestalt,' an 'unconscious body of needs, images, feelings, values, role models, previous experiences and behavioural tendencies which together create a sense of identity.' Thus, an educator may not always be aware of their educational identity. One of the goals of faculty development should be to help educators become *aware* of their educational identity, leading to a better self-understanding and enabling educators to make more conscious and thus better informed choices in their teaching behaviours. In our studies, we aimed to explore educators' *awareness* of their identity, as articulated during the interviews, because it is the *awareness* of their educational identity which can ultimately lead to a change in teaching behaviours that are more consistent with the learning-centred educational context. Similarly, we aimed to explore educators' *awareness* of their personal educational mission. Having explored educators' different perspectives on being a teacher using Korthagen's model, we intended to develop educator phenotypes, categories of educators with similar perspectives, to better understand why medical educators vary in their perspectives on being a teacher.

Since Korthagen argues that in the development as a teacher, problems at a specific level can best be approached by paying attention to more central levels, we assumed that the levels of identity and mission, which are central to the beliefs level, are particularly relevant to our understanding of factors influencing educators' beliefs about teaching and learning. For that reason, we explored the relationship between educators' beliefs about teaching and learning, and their awareness of their educational identity and mission.

Beliefs about teaching and learning in relation to awareness of educational identity and mission

While studies addressing medical educators' beliefs about teaching and learning are limited, even less is known about the relationship between beliefs and identity. Only a few studies have been reported that show a potential link between medical educators' beliefs and their educational identities.[66,67] However, these studies focus on other aspects of beliefs rather than on beliefs about teaching and learning, exploring for example educators' normative beliefs. The notion of 'educational mission' has received even less attention in the medical education literature. Indeed, we know of only one study in the health professions exploring educators' missions. Steinert and Macdonald[68] focused on what teaching means for educators working in a clinical context. They described physicians' educational mission as 'being morally and socially motivated to teach, wanting to contribute to the next generation of physicians, which gave them a sense of personal fulfilment.' The finding that physician-educators who are aware of their educational mission experience personal fulfilment in their role as educators, underlines the potential relevance of an educator's educational mission. However, this study did not relate medical educators' missions to their beliefs about teaching and learning.

Thus, we aimed to relate medical educators' beliefs about teaching and learning to their awareness of their educational identity and mission. Beliefs about teaching and learning were analysed through the beliefs framework that we adapted to the medical education context, using the framework of Samuelowicz & Bain[16] as a starting point. Awareness of educational identity and mission were analysed according to the educator phenotypes that we developed, using the model of Korthagen as a starting point.

Assuming a relationship between learning-centred beliefs and awareness of educational identity and mission, a next step is to gain insight into whether and how medical educators can *develop* their perspectives on being a teacher over time.

Maturation of medical educators: the development of perspectives on being a teacher

Further understanding of how medical educators develop their perspectives on being a teacher, i.e. their perspectives on the educational environment, their educational behaviours & competencies, identity, and mission, can be useful to help promote the maturation of educators towards more learning-centred beliefs and behaviours. We use the term 'to mature' to emphasise our viewpoint that the development of an educator is a holistic and ongoing process that takes place in the everyday work

setting. Most studies in medical education context have focused on the development of medical educators' competencies, in particular their pedagogical knowledge and skills.[64,69] Until now, insights into the development of an identity and personal mission as a teacher are scarce.[64,70] A limited number of studies explored the development of medical educators' educational identity, mostly in the context of longitudinal faculty development interventions.[71-73] However, informal learning opportunities in authentic settings are suggested to be at least as important for the development of medical educators as formal faculty development interventions.[74-77] A few studies explored the development of medical educators' educational identity outside of a formal faculty development intervention. Browne et al.[78] and Cantillon et al.[79] determined the development of an educational identity in retrospect, as self-identified or self-perceived by the participants in their studies. Van Lankveld et al.[80] explored the development of an educational identity of beginning pre-clinical educators through a follow-up study, thus reducing the risk of recall bias. However, in Van Lankveld's study, the vast majority of educators were not involved in patient care. While not all educators in pre-clinical medical education have a medical background or are involved in patient care, the vast majority of educators are. Moreover, a recent review[65] concluded that educators who are involved in patient care 'reconcile' their educational identities with their identities as patient-care providers, thus implying a reciprocal influence of both identities. Therefore, we focused in our research in particular on educators who also have a patient-care role.

With regard to the development of medical educators' personal educational mission, the literature is even more limited: we know of no such research within the medical education context.

In summary, we aimed to explore if medical educators mature and develop their perspectives on being a teacher over time, and which factors they perceive as contributing to this maturation. Until now, insights into these processes were not available within a learning-centred medical education context. These findings can provide relevant input for faculty development to help support and foster the maturation of medical educators towards more learning-centred beliefs and behaviours.

Aim of this research and central research questions

Thus, the overarching aim of this research is to deepen our understanding of how medical educators working in learning-centred education contexts mature over time, in particular in their awareness of their educational identity and mission, and how this maturation relates to their beliefs about teaching and learning.

In order to reach this central goal, the following primary research questions have been formulated:

1. What are the content and structure of medical educators' beliefs about teaching and learning?
2. What is the variety of medical educators' perspectives on being a teacher? How can this variety be clustered into educator phenotypes?
3. How are medical educators' beliefs about teaching and learning related to the awareness of their educational identity and mission?
4. To what extent do medical educators mature in their perspectives on being a teacher over time, and which factors contribute to this maturation?

Outline of research with an overview of the studies

In order to answer the research questions formulated above, we performed qualitative studies, using an exploratory approach. In the study presented in Chapter 3, we included a quantitative analysis as a supportive tool to increase our understanding of the qualitative data. To obtain a broad diversity of beliefs, we recruited medical educators from two medical schools from two different continents, which therefore differed in educational and national culture and organisation. Leiden University Medical Centre (LUMC), the Netherlands, and Stanford University School of Medicine (SUSM), USA, are comparable in their emphasis on scientific education and had implemented reforms towards learning-centred education in the decade prior to the first interviews. In the period between the first interviews and the follow-up interviews (2008-2018) curriculum reform took place at LUMC. The curriculum maintained its learning-centred approach but placed more explicit emphasis on students' active learning. In addition, an intensive faculty development programme was implemented in which almost all LUMC participants participated. At SUSM, which already had an intensive faculty development programme, no major changes had been made to the preclinical curriculum or to faculty development programmes during this interval.

We intentionally chose to select educators who taught in a preclinical setting, as in this setting, learning-centred education is most clearly designed and implemented. Since beliefs about teaching and learning may vary according to the level of teaching,[13,15,16] we also wanted to exclude difference in course level as an influencing factor. Another selection criterion was educators' educational involvement and perceived excellence. The rationale for this selection is that we are specifically interested in the beliefs of the 'best,' most respected -and therefore influential- educators.

The first research question, 'What are the content and structure of medical educators' beliefs about teaching and learning?' is addressed in Chapter 2. To explore educators' beliefs about teaching and learning, we performed semi-structured interviews (Dataset 1a) in the period of 2008-2010. Through a content analysis using the Samuelowicz & Bain[16] framework as a starting point, we adapted and validated this higher education beliefs framework to the medical education context.

During these interviews we also explored (Dataset 1b) the educators' perspectives on being a teacher, to answer our second research question: 'What is the variety of medical educators' perspectives on being a teacher?' Chapter 3 presents the results of this study. We used Korthagen's model to analyse and categorise the findings and subsequently clustered the participants into educator phenotypes.

To answer the third and fourth research questions, we repeated the interviews a decade after the initial ones (Datasets 2a and 2b) with the same participants who were still available, to re-examine their beliefs about teaching and learning as well as their perspectives on being a teacher.

Chapter 4 describes the results of the analysis (Datasets 2a and 2b) executed to answer the research question: 'How are medical educators' beliefs about teaching and learning related to the awareness of their educational identity and mission?' We performed a deductive thematic analysis using the instruments developed in Chapters 2 and 3 to analyse educators' awareness of their educational identity and mission, and their beliefs about teaching and learning, respectively. Subsequently, we examined the relationship between these two areas of inquiry.

Chapter 5 addresses the fourth research question: 'To what extent do medical educators mature in perspectives on being a teacher over time, and which factors contribute to their maturation?' In this follow-up study we used Dataset 1b (collected in the 2008-2010 period) and Dataset 2b (collected in 2018) to examine if educators had developed in their perspectives on being a teacher. Since educational beliefs are widely known to be resistant to change, we anticipated that educators' perspectives on being a teacher might be similarly resistant to change, which argued for a lengthy interval between initial and follow-up interviews. We performed a deductive thematic analysis on both datasets using the educator phenotype model from Chapter 3, to determine which educators had matured in their perspectives on being a teacher. Next, we conducted a third interview (Dataset 3) with the educators who had developed in their perspectives on being

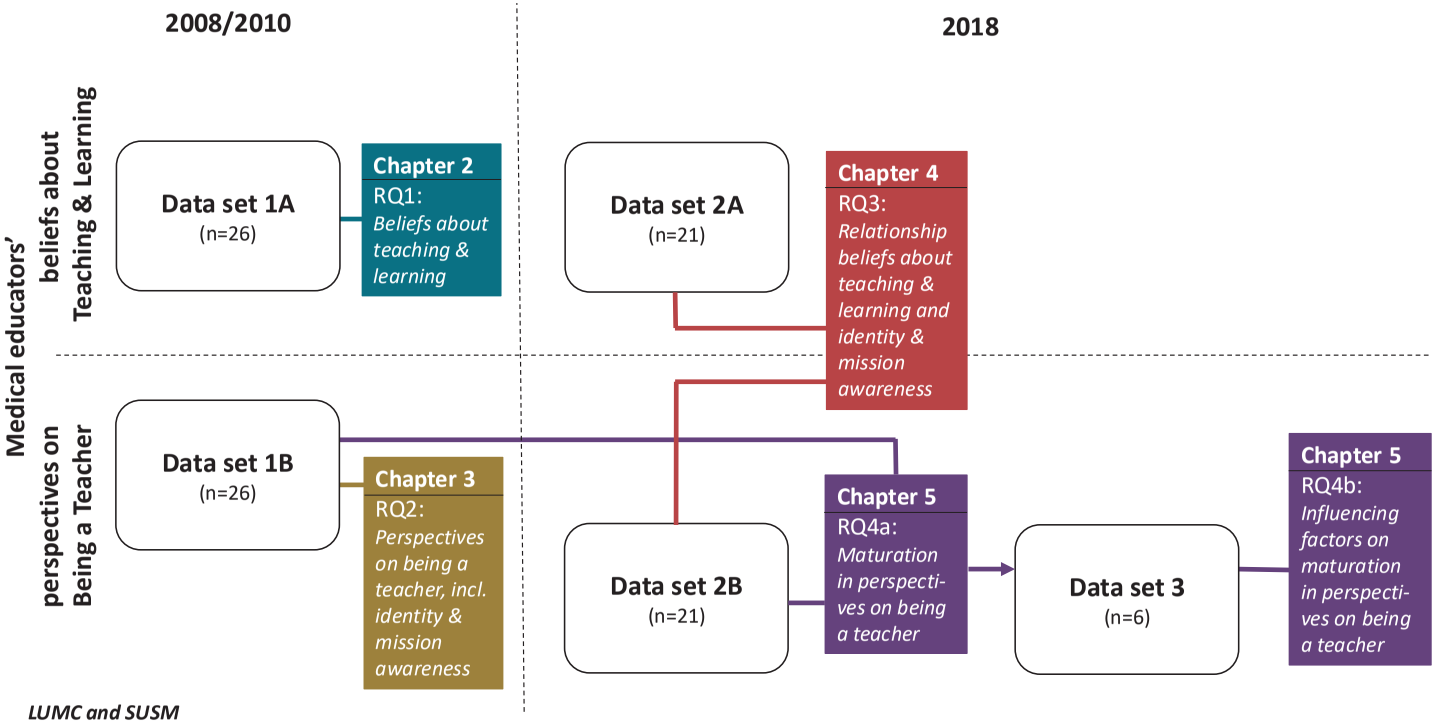


Figure 1.3. Overview of chapters in relation to perspectives on being a teacher and beliefs about teaching and learning, including the different research questions (RQs), and the datasets used to answer the RQs.

2008/2010; 2018 = years of data collection; RQ = research question; LUMC = Leiden University Medical Centre; SUSM = Stanford University School of Medicine.

a teacher. Having asked them to reflect on the differences between their answers at the two time intervals, we then performed an inductive content analysis on Dataset 3, to explore which factors these educators perceived as contributing to their maturation. Figure 1.3 provides an overview of the chapters, including the different research questions and the datasets used.

Finally, in the General Discussion in Chapter 6 we address and reflect on the main findings and overall conclusions of the research projects, including strengths, limitations, and suggestions for future research, and practical implications for faculty development.

The terminology in the various chapters does not always correspond to the description in this introduction. This is due to the fact that this research is based on separate articles published in peer-reviewed journals and specific characteristics in a particular study sometimes necessitated deviating terminology.

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