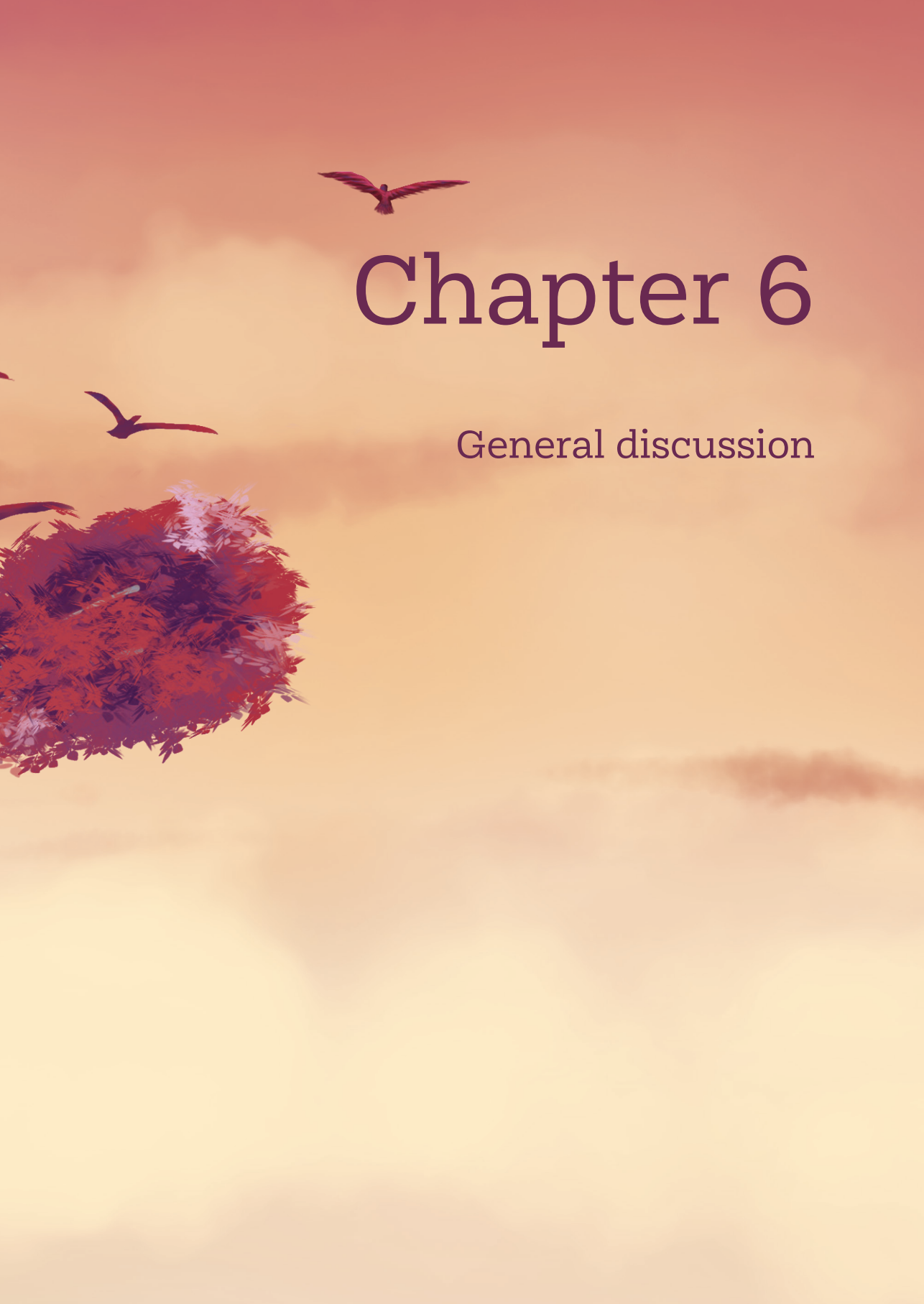
Exploring the maturation of medical educators and their beliefs about teaching and learning: the value of a personal educational mission

Ottenhoff-de Jonge, M.W.

‘You cannot teach
people anything.
You can only help them
discover it within themselves’

– Galileo -



Chapter 6

General discussion

GENERAL DISCUSSION

The studies presented in this dissertation were performed to increase our understanding of how medical educators working in learning-centred education contexts mature over time, and how this maturation is related to their beliefs about teaching and learning. This central goal led to the following main research questions:

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?

In this chapter we will discuss our main findings, conjoin them and relate them to the current literature. We have explored educators' maturation from a holistic perspective. This means that we not only examined how they perceive their behaviours and competencies, but also how they perceive the educational context, their identity and mission as teachers, and what they believe about learning and teaching. This led to the two main lines of our research, which are: the beliefs of medical educators about the process of teach*ing* and learning, and their perspectives on being a teach*er*. After discussing these two lines of research, we will discuss two themes that emerged from our research findings as particularly relevant: the role of the environment, and the role of mission. This culminates into a discussion on the maturation of educators. Finally we conclude this chapter describing the strengths and limitations of our research project; suggestions for future research; and specific recommendations for practice.

Beliefs about teaching and learning

Our exploration of medical educators' beliefs about teaching and learning led to a better understanding of the content and structure of the diverse beliefs, and resulted in a new framework, contextualised in the medical education context (see Chapter 2, Table 2.1). In Chapter 2 we discussed the changes required to adapt the original framework of Samuelowicz and Bain[1] to the medical education context. Here we will discuss the main results, and elaborate in more detail on the significance of our findings for learning-centred education.

We identified a new belief dimension which we labelled: 'Creation of a conducive learning environment.' While educators with a learning-centred belief orientation stressed its importance, and viewed it as a prerequisite for student learning, most educators with a teaching-centred belief orientation were unaware of this dimension. Educators with a teaching-centred belief orientation with learning-centred aspects (Orientation III, see Table 2.1) did emphasise its relevance, but for a different reason, namely to put students at ease. In this Orientation (III), the interaction between teacher and student is more reciprocal than in the other teaching-centred orientations. In contrast to the learning-centred orientations, the focus is primarily on the students as a group rather than as individuals, and on relating to the students in a positive way rather than on specifically facilitating the *learning* of the student.

We also were compelled to refine existing belief dimensions. One of these is the dimension 'Nature of knowledge,' which needed to be expanded from two to three beliefs. In addition to knowledge, this dimension also includes skills and attitudes relevant to the discipline. The original framework distinguished one teaching-centred belief and one learning-centred belief. In the new framework, the teaching-centred belief of knowledge as factual and as obtained from outside, split into two beliefs. We uncovered that educators in the teaching-centred belief orientation with learning-centred aspects (Orientation III), although viewing knowledge as coming from external sources, believe that they should explain how this 'factual knowledge' can be used in the realities of medical practice. Figure 6.1 visualises and summarises the relationship between teacher, student, content, and environment, as it emerges from the new framework, for two maximally contrasting belief orientations: teaching-centred Orientation I (Fig 6.1.A) and learning-centred Orientation VI (Fig 6.1.C), as well as for the teaching-centred with learning-centred aspects orientation: Orientation III (Fig 6.1.B).

By contextualising the framework in the medical education context, we gained a deeper and more detailed understanding of medical educators' beliefs relevant to learning-centred education. This applies to most of the 'cognitive' dimensions (see Chapter 2, Table 2.1, Dimensions 1-6), but in particular to the 'affective' belief dimensions (Dimensions 7- 9). The cognitive belief dimensions of medical educators with learning-centred beliefs are *qualitatively* distinct from those with teaching-centred beliefs and can be summarised as focusing on conceptual change in students, with the aim of developing medical expertise, i.e., mastering a physician's knowledge, skills, and attitude.

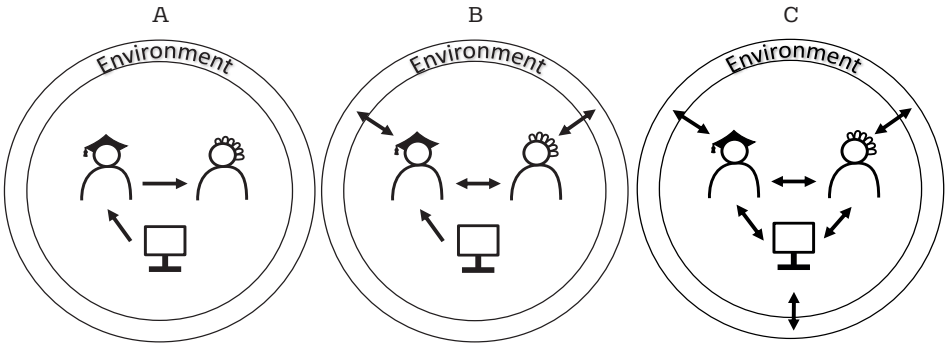


Figure 6.1. The relationship between teacher, student, content, and the learning environment for three different belief orientations: teaching-centred (A), teaching-centred with learning-centred aspects (B), and learning-centred (C).

The two affective dimensions which Samuelowicz and Bain[1] included in their framework each distinguish whether educators are aware or unaware of these dimensions, but do not elucidate the content of this awareness. The new framework not only adds one new, affective, dimension, but also gives a differentiated content to the three affective belief dimensions. One of these dimensions (Dimension 8) relates to the professional development of the student, and includes competencies relevant to future physicians such as communication and collaboration, as well as issues related to professional identity formation. This belief dimension recognises that there is more to being a physician than just mastering a physician's knowledge, skills, and attitude. A second dimension (Dimension 9) relates to the student's personal motivation for learning, thus acknowledging that motivation has a significant impact on the process of learning and development. A third (Dimension 7) relates to the influence of the learning environment, emphasising that learning does not take place in isolation but is importantly influenced by context, including the (physical) setting and interactions with peers and teachers.

Since educators with learning-centred beliefs emphasise these affective dimensions, while educators with teaching-centred beliefs are unaware of them, we can conclude that educators with learning-centred beliefs not only have *qualitatively different* beliefs, but also more *comprehensive* beliefs about the process of teaching and learning.

This outcome is significant as it broadens our understanding of beliefs about teaching and learning out into a more holistic view that incorporates not only cognitive dimensions, but also affective dimensions relevant to student learning and development. It also confirms that specific attention to affective dimensions can positively and powerfully influence the outcomes of learning-centred education,[2] and thus has implications for faculty development, as will be described in more detail under the Practical implications section.

Our finding that even in medical schools with long standing learning-centred curricula, a significant proportion of the most experienced and engaged educators still held teaching-centred beliefs about teaching and learning suggests that individual development towards learning-centred beliefs is neither easy nor self-evident. We suppose that at least two factors play a role here. First, as the framework clearly illustrates, beliefs about teaching and learning do not just concern a single belief but a whole system of interrelated beliefs, which, in line with Samuelowicz and Bain,[1] we refer to as a 'belief orientation.' Indeed, we have shown that in the development from a teaching-centred to a learning-centred belief orientation, many beliefs (eight out of the nine) would be required to change. A second factor that may play a role is that, even when the formal educational context of a medical school may embrace learning-centred education, the implicit educational culture of the organisation may still favour teaching-centred beliefs. This may have a constraining influence on medical educators' beliefs about teaching and learning, as some studies confirmed.[3,4] These findings are relevant for two reasons: the persistence of teaching-centred beliefs underscores the importance of our research into why educators hold certain beliefs. Second, they suggest that the environment, i.e. the educational context including the informal teaching culture, may be an important factor influencing the beliefs of educators, which will be further discussed below. From a practical point of view, this implies that faculty development (FD) should pay explicit attention to beliefs about teaching and learning, as confirmed by others.[1,5-10] So far, FD programmes still generally focus on the development of competencies, in particular the acquisition of pedagogical knowledge and skills,[11-13] for example by giving workshops which train educators how to teach small groups, or how to develop a teaching module. In addition, FD need to pay attention to the educational context. This will be further discussed under the Practical implications section.

Perspectives on being a teacher

In our search for factors influencing educators' beliefs about teaching and learning we explored their perspectives on being a teacher (Chapter 3), for which the model of Korthagen (see Chapter 1, Figure 1.2) proved to be a useful model.

We used the levels of the Korthagen model to cluster the participants qualitatively into educator phenotypes. The levels that individual participants emphasised as most relevant were leading for the clustering.

The clustering process generated four educator phenotypes, which are hierarchically ordered by inclusiveness. This means that phenotype B includes the levels of phenotype A; phenotype C includes the levels of phenotype B; phenotype D includes the levels of phenotype C, but not vice versa. The Critic phenotype (A) represents the educators who emphasise the environment, focusing in particular on adverse environmental circumstances. The Practitioner phenotype (B) represents the educators who are aware of the environment and focus on their educational behaviours and competencies. The Role model phenotype (C) represents the educators who extend their awareness to include their educational identity. In the Inspirer phenotype (D) the educators are aware of the levels of the other phenotypes and focus on their educational mission.

The educator phenotype model thus takes into account the educational environment or context. While all four phenotypes are aware of the importance of the educational context, the Critic phenotype specifically focuses on adverse contextual aspects. This can be interpreted as an affirmation that education sometimes receives less priority within academia than the other academic core tasks of patient care and research.[12,14,15] We assume that this phenotype may not be a permanent end-stage phenotype nor a 'starting' phenotype. Our findings suggest that the perspectives on being a teacher may be temporarily distorted due to dissatisfaction with professional or personal circumstances.

Figure 6.2 illustrates how the four phenotypes are hierarchically ordered, including their focus and awareness of the different levels related to perspectives on being a teacher.

We also discovered that the perspectives of the Role model and Inspirer phenotypes consist of predominantly affective aspects. For example, as their mission, they articulate the desire to bring out the best in the student, or as their identity, to be someone who enjoys teaching. This confirms the conclusions of two review studies which emphasise the importance of affective personal attributes for clinical teachers.[16,17] For faculty initiatives this finding implies that, in order to become aware of one's educational identity and mission, it is helpful to accommodate these affective aspects (see under Practical implications).

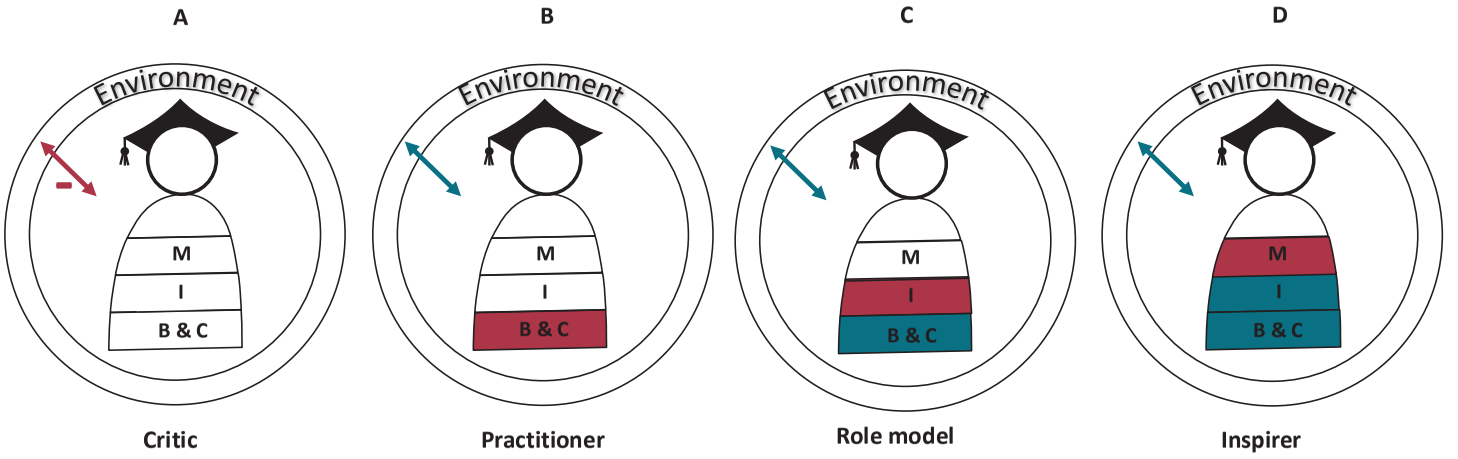


Figure 6.2. The four educator phenotypes.
B&C = educational Behaviours & Competencies; I = educational Identity; M = educational Mission; Blue = area of awareness; Red = phenotype's main focus.

We will describe under separate headings the role of the environment and mission, which emerged so prominently from our findings.

The environment

The environment plays a role in both our lines of research. Our study on educators' beliefs about teaching and learning shows that educators with learning-centred beliefs indicate that they feel responsible for creating a safe, stimulating, conducive learning environment for student learning. This means that the student's environment is included as part of the educators' belief system about student learning and development.

The environment also appears to play a major role in educators' perspectives on being a teacher: all educators were aware of the importance of the environment for their functioning as teachers. We discovered that it is not only the objective, observable environment, but particularly the educators' *perceived* environment which influences their functioning, and in which affective aspects are included. While, in line with other studies,[12,18] in the Critic phenotype the environment is mainly experienced as restrictive, educators in the other phenotypes have a more varied experience of the environment. They also acknowledge negative elements in the environment, but additionally emphasise positive elements, for example how recognition of the importance of teaching by the administration can contribute to their functioning as teachers. Thus, similar to the first line of research, the environment is also incorporated into educators' perspectives on being a teacher. This has theoretical significance because it sheds a different light on the educational environment: not only as an objective reality situated outside of the person, but also as a personally constructed or perceived reality. It also has practical significance for faculty development, which we will discuss further under the Practical implications section.

Mission

One of our most prominent findings with regard to perspectives on being a teacher is the importance of being aware of one's personal mission as a teacher. A mission can be defined as the source of one's deepest motivations that drive and guide an educator in their teaching. One important characteristic of a mission is that it is not focused on the self, but on the other, and on desiring to contribute to a larger community and its contexts. The notion of educational mission has not received much attention in the medical education literature. While medical educators' motivation to teach has been the subject of multiple studies, particularly within the 'professional identity' literature,[12,14,19-21] the concept of motivation is not

identical to the concept of mission. Two important differences with mission, are, first, that motivation can refer to short-term, temporary goals, and second, that motivation does not necessarily have to be focused on others.

In our studies (Chapters 3, 4, and 5), we discovered that in the concept of mission, affective aspects predominate, and that *meaningful contact with students* is an important theme. Educators with a personal educational mission, who desire to contribute to the student's learning and development, describe their mission as a teacher for example as '*caring about the students, that they learn something, that's the first thing*.' Other studies confirm the relevance of meaningful contact with students, and relate this to educators' motivation to become and remain involved in education.[22-26]

Moreover, we discovered that the educational mission of medical educators, all involved in patient care, is fuelled by their mission as a physician: they aspire to contribute to the well-being of their patients and/or healthcare in a broader sense (see Chapters 3 and 5). In line with their mission as a physician, they have become aware of their mission as a teacher: they envision that, through their involvement with the next generation of physicians, the patients of these future physicians will benefit. It is this awareness that gives great enjoyment and satisfaction to being a teacher. For example, one educator in the Inspirer phenotype commented: '*I enjoy teaching because I get very energised, I love students and I think they are interesting, and I love what I do (as a physician), so I kind of like to get them to love what it is (being a physician).*' That educators perceive being able to contribute to the next generation of physicians as deeply rewarding and satisfying has been confirmed elsewhere.[20,22,26-28] The enjoyment and satisfaction connected with teaching can thus be seen as the fruit of experiencing that one's efforts are devoted to what one is deeply motivated for, even in adverse circumstances. Enjoyment and satisfaction, in turn, will maintain and strengthen the educator's motivation and commitment.[20] Thus, in addition to the view that satisfaction is a foundational motivator for medical educators,[20] we consider mission awareness as a foundational *source* of motivation. Hence, the pronouncement of the famous Professor of Surgery John Benjamin Murphy (1857–1916), which adorned the largest lecture hall in the LUMC for decades, remains valid: 'The patient is the centre of the medical universe around which all our works revolve and towards which all our efforts tend.' Our findings add a new dimension to this statement: not only is it directly applicable to patient care but, as our results show, also to medical education.

From our studies, three other important findings in relation to mission awareness emerged. First, educators who are aware of their educational mission (in the Inspirer phenotype) have the most comprehensive perspective on being a teacher, as demonstrated by the hierarchical ordering of the educator phenotypes (see Figure 6.2). This means that all educators who are aware of their deepest motivations as teachers are also aware of the importance of the relevant competencies (i.e. knowledge, skills and attitude) as a teacher, and of their identity as a teacher. This finding contributes to the discourse on the development of identity as a teacher, in which the relevance of explicating one's personal educational mission often remains implicit. Significantly, awareness of one's mission as a teacher can reinforce and nurture one's identity as a teacher. Thus we suggest that, next to paying attention to *who* one wants to be as a teacher, focusing on the teacher themselves, the question of *why* one wants to be an educator, what one aims to contribute, is at least as important in faculty development.

Second, a mission awareness is related to an educator's beliefs about teaching and learning. Here the relationship between the two lines of research becomes clear. In our study, educators who are aware of their mission all have a learning-centred belief orientation. This means that they have the most comprehensive beliefs about the process of teaching and learning in which both cognitive and affective dimensions are incorporated. We assume that awareness of their mission as teachers gave them a high level of motivation to become educators who encourage student learning, to actively seek opportunities as to how this can be achieved, and to take action. Thus, supporting educators to become aware of their mission as teachers appears to be a key to promoting learning-centred beliefs.

Third, a mission awareness appears to be helpful to maintain and reinforce a learning-centred belief orientation: educators who are aware of their mission as a teacher seem to be more resilient to a non-supportive culture in which education is given little priority. This is significant since recent medical education studies emphasise the major impact which the environment can have when medical educators experience a lack of support in the workplace.[12,15,18,27,29-31] When mission awareness is not well developed, the choices which an educator makes seem to be primarily based on what the environment expects or on rewards, which is in line with the conclusions of a study on life mission and adult learning.[32] Another recent meta-analysis[33] confirms our findings and concludes that when people experience their work as deeply meaningful, in particular when it is focused on

others, this not only contributes to psychological well-being, but can also protect people from the hardships of their work, even in extreme contexts.

We conclude that mission awareness is highly relevant to functioning as a teacher, as a mission guides adult lifelong learning and development. Almost a century ago, one of the founders of adult education in the USA indicated that adults learn in order to give meaning to life.[34] More recently, a study confirmed that mission awareness has a strong impact on adult learning and suggested that a mission awareness directs both the level of motivation to learn and the learning choices that the individual makes.[32] So, being aware of one's mission as a teacher gives meaning to an educator's professional life and can fuel motivation for further development and maturation as a teacher.

Maturation of medical educators

In our 10-year follow-up study (Chapter 5), we explored how educators mature in their perspectives on being a teacher. We concluded that perspectives on being a teacher can develop over time, but that maturation is not self-evident and happened in only a minority of the educators. In other words, educators' perspectives on being a teacher appear as relatively stable and do not change easily. We discovered that maturation proceeds through 'developmental stages' and follows the order of the phenotypes from less to more inclusive. Our finding of developmental stages corresponds with an '*individualist*' view-point on how educators mature, which situates maturation within the individual[14,35] and pays attention to affective outcomes such as psychological well-being.[36] In addition, the least inclusive, 'Critic' phenotype, which highlights the influence of the educational context on the maturation of educators, fits a '*social-relational*' view-point on maturation. In this view-point, maturation is perceived as fluid and constructed, negotiated through social interaction in cultural contexts.[14,35] Indeed, our findings suggest that the Critic phenotype may be a more transient phenotype. An educator may temporarily lose sight of their competencies, or identity or mission as a teacher, when these become suppressed by the experience of unfavourable external circumstances. These circumstances may be work-related, such as a lack of appreciation for education within the organisational culture, particularly by peers, department heads or the higher education administration. Furthermore, we discovered that, in retrospect, difficult private circumstances may also play a role. Reasons that we have only been able to determine these private circumstances as influencing factors in hindsight may be that an educator is not aware of the influence of the private circumstances on their professional functioning, or does not yet want to disclose them while they are happening.

Thus, our finding that maturation occurs according to the order of Practitioner *via* Role model to Inspirer phenotype, suggests that educators focus on their competencies first before becoming aware of their identity as teachers. In other words, feeling competent as a teacher appears to be a prerequisite for shifting focus to one's identity as a teacher, as a review article in the context of higher education confirms.[24] Interestingly, the same order in developmental stages has been described in the development of medical students as physicians-in-training.[35] As the student progresses, the development expands from an initial focus on the 'knowing and doing,' i.e. the core *competencies* of a physician-in-training, to 'being,' i.e. the *identity* as a physician. Similarly, our findings show that educators focus on their identity first before becoming aware of their mission as teachers. We assume that only when an educator has gained sufficient confidence in their own identity as a teacher, and is no longer concerned with positioning themselves as a teacher, can they shift their focus from themselves to the students' learning and development, and mature towards a clear understanding of *why* they want to be a teacher. A similar shift in focus from self towards others, the learners, was reported in a study on the development of mentors in medical education.[37] Interestingly, the 'why' question also appeared in a recent publication on leadership development in medical education.[38] Although the term 'mission' was not used, the study emphasised the relevance of 'finding your purpose and passion' as an educator in the context of developing as a leader.

Because the phenotypes are hierarchically ordered from less to more inclusive this means that the perspective on being a teacher is extended from an educator's awareness of their competencies (the Practitioner phenotype) to, successively, an awareness of their identity (the Role model phenotype) and mission (the Inspirer phenotype) as a teacher. In other words, maturation can be perceived as an expansion in perspective, in the sense of a growing awareness towards a more inclusive, more holistic perspective on being a teacher. This view on development is consistent with the theory of transformative learning, a theory of how adults learn by making meaning of their experiences, developed by Mezirow.[39] According to this theory, learning is a transformation of perspective, where the new perspective is more inclusive, in the sense of being open to alternative viewpoints, and guides future action.[39,40]

At each step of the educational development process, maturation appears to occur primarily in the setting of the everyday workplace. This finding is in agreement with Jippes et al.[41] who concluded that informal learning in the workplace has more impact on the development of clinical educators than formal faculty development interventions.

Moreover, and strikingly, educators spontaneously referred to their role as physicians at each step when asked what had influenced their development as a teacher. Their primary motivation to be a competent teacher (Practitioner phenotype), to identify with the educational role (Role model phenotype), or to contribute to student learning (Inspirer phenotype) lay in their motivation as practising physicians to contribute to patient care. This is consistent with the results described in Chapter 3 in which we explored educators' perspectives on being a teacher. While we asked about what makes a good teacher, educators not only indicated aspects related to educational competencies, identity, and mission, but also aspects related to competencies, identity, and mission as a physician.

Thus, while it has often been reported that development as an educator is *constrained* by the role as a physician,[14,15,27,29-31,42] we conclude that the role as a physician is also *a source of motivation* to develop as a teacher. A recent study on the maturation of physician-mentors also concluded that the role of mentor and clinician can mutually validate and reinforce each other.[37]

Finally, factors perceived to be instrumental in maturation could be categorised under *intrapersonal aspects* and *meaningful experiences*. Intrapersonal aspects refer to factors educators experienced as part of their 'inner self.' The relevance of the meaningful experiences is not so much the experience itself, but rather the meaning that educators assigned to the experience. The extent to which the two categories play a role, as well as which factors are seen as contributing to maturation, vary by phenotype. Thus, the educator who matured to the Practitioner phenotype attributed his maturation primarily to *meaningful experiences*, such as tasks and activities which had helped him to develop more effective competencies as a teacher. The educators who matured to the Role model phenotype attributed their maturation primarily to *intrapersonal aspects*, such as being reflective on the 'self' and on the teacher role, which had helped them to become more self-aware of their educational identity. The educators who matured to the Inspirer phenotype attributed and related both categories of factors to their maturation. For example, they indicated that they had become aware of the importance of learning to remain silent in order to listen more closely to what a patient or student had to say. They linked this *intrapersonal aspect* to *meaningful experiences*, such as encounters with indigent patients. The combination of these factors had helped shift their focus from themselves to their patients and their students, and had been influential in the development of their mission to contribute to student learning. They articulated, for example, the mission to help students become aware of the importance of philosophical, spiritual, ethical or societal medical issues. This finding is consistent

with the theory of transformative learning, which states that adult learning is triggered by 'disorienting dilemmas' (comparable to *meaningful experiences*), coupled with 'critical reflection' (comparable to *intrapersonal aspects*).[39]

Interestingly, the Critic phenotype educators who initially focused on the adverse educational environment, also attributed their maturation when shifting from the Critic phenotype to both categories of factors. They recognised that, next to a perceived positive change in the circumstances (categorised as *meaningful experience*), their personal attitude to these circumstances (categorised as *intrapersonal aspect*) had changed. For example, they reflected on an improved organisational structure or the arrival of a new department head, as well as acknowledged that they had learned to come to terms with the perceived restrictions of the educational context. This means that a change in the educational environment alone will not be enough to help educators shift from the Critic phenotype. Congruent with our conclusions under the 'Environment' section, it is the *perception* of and reflection on the environment, next to the reflection on inner processes, which will influence maturation.

These conclusions have important implications for faculty development, which we will describe below.

Strengths, limitations, and suggestions for future research

Next to study-specific methodological considerations, which have been described in the previous chapters (Chapters 2 to 5), we will address general strengths and limitations of our research here, and also include suggestions for future research.

One strength of the research is the methodological rigour used. In each study, multiple researchers independently analysed the transcripts and discussed their interpretation among themselves, and then within the research team. The team members come from diverse backgrounds, both medical and non-medical. This approach ensured reflexivity to identify and address any personal beliefs or biases that may have influenced the research process, and intersubjectivity to reach agreement on the interpretation of the findings through dialogue and the sharing of meanings. Additionally, the data collection for both the baseline studies and the follow-up study were conducted by the same interviewer, which eliminated interpersonal variations and enabled a deeper insight into the person of the interviewees. Executing the interviews by a single rather than more than one interviewer creates a safe environment for the interviewee. To counteract the limitations of having a single interviewer, the research team carefully

prepared and discussed the interview protocols with experts in medical education research outside the team. In addition, we received and used feedback from pilot interviewees who did not participate in the main study. Furthermore, the provision of thick descriptions of quotes in each study enhanced the rigour of the research.

Another strength is the design of the research covering a time span of 10-year follow-up period. Because maturation takes time and studies with such a long interval in their design are rare, the follow-up study yielded valuable data to gain insight into the long-term maturation of medical educators' beliefs and perspectives, which might not have emerged in a shorter research period. Because the number of interviews per participant is limited to two (plus a third interview with those who showed maturity), we cannot exclude that a longitudinal design of a more than 2-point study could have provided additional insights into the maturation trajectories of individual physician-educators.

The way we selected the participants has implications for the interpretation of our findings. Since participants were recruited from two medical schools from two different continents, a strength is that our results are not limited to one national educational culture and organisation. We selected medical schools that were carrying out innovations towards learning-centred education during a similar time period, i.e. about a decade prior to the initial interviews. It is conceivable that the selection of schools with a longer or shorter tradition of learning-centred education would have resulted in a different distribution of belief orientations. We selected medical educators with a variety of educational roles: both educators involved in educational administration and educators half of whom taught clinical topics while the others taught basic science topics, which adds to the generalisability of our conclusions. We also deliberately chose to select participants who are known for their exemplary teaching. It is important to note that we did not aim to generalise across all educators, but that we were particularly interested in the beliefs of the most committed, exemplary, and therefore most influential educators. We assume that the selection of involved and committed teachers contributed significantly to the fact that almost all participants were still available for the follow-up study after ten years. However, this selection may have limited the variation in both belief orientations (Chapter 2) and educator phenotypes (Chapter 3). Nonetheless, as discussed in Chapter 2, all six belief orientations from the original framework of Samuelowicz & Bain[1] were represented. Likewise, all the levels from Korthagen's model, which were decisive for the development of the phenotypes, were represented in the initial study (see Chapter 3). The sampling may also have resulted in a limited number of

educators demonstrating maturation (Chapter 5), as some of them already had the most inclusive educator phenotype at their first interview. Therefore, it would be useful to repeat this research with younger and with less experienced educators; such a study would be expected to yield more participants with growth potential regarding their educator phenotypes. It is difficult to predict how the distribution of the various belief orientations of such a cohort would turn out. Lack of teaching experience may result in more teaching-centred beliefs, since in some studies teaching experience is related to learning-centred beliefs.[43,44] At the same time, being educated in more current, up-to-date, learning-centred, curricula, with more emphasis on self-reflection, may also result in more learning-centred beliefs. Finally, we cannot rule out that the finding that educators did not reverse to less inclusive phenotypes in our follow-up study (Chapter 5) is related to our selection of exemplary educators. A study with less motivated or less involved educators might generate different results. The selection of educators who taught in a preclinical setting limits drawing conclusions from our findings for other contexts, in particular with regard to the beliefs about teaching and learning (Chapter 2). Indeed, a postgraduate setting might uncover more learning-centred belief orientations, consistent with the findings of Samuelowicz and Bain.[1,45] On the other hand, we assume that the educator phenotype model will be valid in other educational contexts; firstly because the perspectives on being a teacher, once acquired, are deeply integrated into the person of educator; secondly because in developing the phenotype model we used a model from a different context: Korthagen's model stems from the context of teacher education. Similarly, we expect that the alignment between awareness of educational mission and learning-centred beliefs (see Chapter 4), both deeply rooted, will not be limited to one particular educational context. A future study carried out in other educational contexts could provide further insights.

Other suggestions for future research would be, first, to explore the relationship between educators' beliefs about teaching and learning and their actual behaviours when teaching, through combining interview and observation of individual medical educators. The relevance of our research on beliefs about teaching and learning lies in the supposed relationship between beliefs and behaviours. While a number of studies show a strong relationship between beliefs and behaviours,[46-48] this is challenged by others.[49-51] Moreover, all of these studies have been conducted outside the context of medical education. Second, it would be enlightening to explore the development of educators' beliefs about teaching and learning, similar to our follow-up study of educators' maturation in perspectives on being a teacher (Chapter 5). Such research could provide further insights into whether educators' beliefs become more learning-centred over time,

whether they are reversible or unidirectional, and which factors they perceive to be of influence to their development. The new framework as presented in Chapter 2 (Table 2.1) could serve as a useful instrument for such a follow-up study. Moreover, such a study could confirm whether the development towards more learning-centred beliefs influences the maturation towards more inclusive educator phenotypes, and vice versa.

Practical implications

To support and facilitate student learning in a learning-centred educational context, we propose a holistic approach to the development of medical educators based on our research. This means that faculty development (FD) initiatives need to be diverse, and not just focus on the development of competencies: attention should also paid to beliefs about teaching and learning,[1,5-10] to awareness of an educational identity,[19,21,52] and in particular to awareness of a personal educational mission, of which the latter has so far received little attention in the literature. In addition, they should include the medical educational context.[13-15]

Before going into detail about how FD can address this development, we will first discuss some general recommendations for FD based on the results of our research.

General recommendations

First, FD can best be embedded in the workplace, thus extending over time, for example through communities of practice,[53,54] as educators indicate that their maturation is most influenced by informal learning opportunities (Chapter 5). Second, since medical educators explicitly link their maturation as an educator to their role as a physician (Chapter 5), the role of physician should be included in FD interventions. This is in line with Steinert's[55] advice not to focus exclusively on the educational role in FD, but to target all roles that medical educators play. Third, involving practising physicians as faculty developers and mentors may be valuable in FD (Chapter 5). This recommendation is also supported by our finding in the initial study (Chapter 3) that the Inspirer phenotype consisted exclusively of Stanford University School of Medicine (SUSM) educators. As discussed in Chapter 3, one explanation for this may be the influence of the esteemed and influential faculty developer responsible for the professional development programmes at SUSM, who turned out to be a practising physician.

Finally, we recommend two activities to support educator maturation at all stages of development. The first is the intrapersonal activity of *reflection*, the second is the external activity of *meaningful relationships with others*. Affective aspects play a major role in the learning-centred belief orientations, and also predominate in the articulation of an educational identity and mission. These affective aspects can be eminently addressed in meaningful relationships with colleagues and students. In addition, meaningful relationships can serve as an important trigger for reflection on the 'self' and on the process of teaching and learning. One way to embed the relationships with colleagues is through personal networks or communities of practice in the workplace, or through more formal longitudinal programmes with a group of educators who know each other,[15] which can create a sense of belonging. Coaching or mentoring students can provide useful feedback on one's effectiveness as a teacher, increase understanding in the process of student learning, and provide motivation to remain involved in teaching.

Recommendations per developmental stage

The development of *competencies* of educators can be supported by offering varied educational tasks and responsibilities, tailored to further the development of the individual educator. Activities such as mentoring, instruction and practice by experienced and respected faculty developers may also prove helpful, as are encounters and (in)formal discussions with like-minded peers about the 'What and how' of an effective educator. In addition, feedback from students can help to grow in educational competencies.

To support the development from teaching-centred to learning-centred *beliefs*, reflection on the teaching and learning process has been suggested.[3,5,56] The new beliefs framework (Chapter 2, Table 2.1) can assist in this reflection, helping educators become aware of their beliefs about teaching, learning, and knowledge by making them more explicit. The newly uncovered extensions to the framework are particularly relevant to the context of learning-centred medical education. Based on our findings, we recommend helping educators reflect on which knowledge is relevant to be acquired, and on the importance of creating a positive learning environment, supporting students' professional development, and fostering students' intrinsic motivation. One way to support this reflection process is through interaction with individual students.

To promote the growth in awareness of one's educational *identity*, initiatives that encourage reflection on the 'self' and on the teacher role can be helpful. The usefulness of reflection has been described in other studies on educational

identity formation.[12,15,19,57] Although the tasks and activities may be similar to those that support growth in competencies, their goal here is to encourage reflection on 'Who' one wants to be as an educator. In addition, personal contact with students, contacts with peers and faculty developers with an articulated awareness of their educational identity may contribute to an educator's growth in awareness of their educational identity.

Encouraging educators to reflect on 'Why' they want to be a medical educator and contribute to medical education may nurture a deeper awareness of one's educational *mission*. Because a hallmark of an educational mission is a focus on the other, a growth in mission awareness requires a shift in focus from one's own teaching role to the student learning role and their development. This can be facilitated through meaningful encounters with students, for example by mentoring individual students over a longer period of time. In addition, discussing one's personal patient-care mission with fellow physician-educators and relating it to one's deeper motives for teaching can support the awakening and maintenance of an educational mission, even when the organisational culture is not supportive of the maturation of educators. Faculty developers who are fully in contact with their own educational mission and put this into practice are helpful and influential as role models.

Finally, FD should pay explicit attention to the educational *environment* and educators' perception of this environment to support educators' maturation. Examples of how the workplace can be beneficial include a supportive leadership at all levels of the organisation, rewarding teaching in career paths, and addressing conflicts created by competing tasks. Offering opportunities that foster the development of educators' competencies, identity, and mission as teachers can be helpful to come to terms with a perceived adverse educational environment. Lastly, we need to recognise that adverse private circumstances can also play a restrictive role in educators' maturation, but are beyond the influence of faculty developers or administrators.

In conclusion

We conclude that, in the context of learning-centred education, maturation of medical educators' perspectives on being a teacher can take place but is not self-evident. Maturation can be influenced and seems to proceed through developmental stages, from educational competencies *via* educational identity to educational mission awareness. At every developmental stage, the role as physician appears to be a source of motivation to develop as a medical teacher. The process of maturation is influenced by educators' perception of

and reflection on both external factors and internal processes; these two factors are interrelated. Perspectives on being a teacher are related to beliefs about teaching and learning: educators with the most mature perspectives on being a teacher have learning-centred beliefs about teaching and learning. In their perspectives, affective aspects play an explicit role. Educators incorporate their perception of the environment into their perspectives on being a teacher and their beliefs about teaching and learning; thus, next to the observable educational environment, the way educators experience the educational environment is at least as important. Being aware of one's personal mission as a teacher can reinforce, nurture and support an educator's identity. Moreover, it gives meaning to an educator's professional life and can fuel motivation for further development, life-long learning, and maturation as a teacher. This is an important explanation as to why educators who are aware of their educational mission have the most elaborate, learning-centred, beliefs about teaching and learning. Thus, supporting educators to become aware of and develop their mission as teachers may not only help them make choices independently of what the environment expects, but is also essential to foster learning-centred beliefs. This dissertation offers a deeper understanding of medical educators' maturation, the factors influencing maturation, and its relationship with beliefs about teaching and learning, thereby contributing to the quality of learning of next generation healthcare professionals.

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