

## Chapter 20

To conclude

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To become an effective science teacher is not straightforward; there is satisfaction, enjoyment, passion and determination, but also bumps and hurdles, disappointments and challenges.

Therefore, in this non-linear and complex journey of becoming a teacher, the role of a mentor is essential, no matter at which stage of the journey a teacher resides.

This book has looked at mentoring beginning teachers, including not only student teachers who are currently completing their initial teacher education (ITE) programme to qualify as a teacher, but also newly qualified teachers (NQTs) and early career teachers. Hence a mentor's roles and responsibilities do not end once a teacher has achieved qualified teacher status (QTS). Rather, it continues beyond the provision of ITE. Therefore, to support you, as a mentor, of a beginning science teacher, this book has highlighted various mentoring approaches, strategies and resources to facilitate your mentoring practices. Your practice should be based on the beginning teacher's developmental needs rather than aligning mentoring support based on a beginning teacher's years of experience.

The suggested mentoring practices presented in this book are drawn from the mentoring experiences of 25 authors and their silent mentors, beginning teachers and pupils. The focus of all authors in this book is firmly on strengthening mentoring practices to support the development of effective beginning science teachers. There is a lot to say in conclusion, but I will highlight some aspects that this book has offered to support you in embracing effective mentoring practices.

Chapters have repeatedly suggested that mentors view and support each beginning teacher as an individual and to acknowledge that there is no one-size-fits-all mentoring style for all beginning teachers. Hence, generalising mentoring styles and associated strategies for all beginning teachers is imprecise and uncertain. Therefore, you need to accept a beginning teacher as an individual and focus on their specific developmental needs/their own point of departure, rather than where you think they should begin from. To accomplish an individualistic approach to viewing a beginning teacher, you must become self-reflective about your mentoring practices

on a regular basis, such as what style of mentoring you are comfortable with. Does a beginning teacher respond well to your specific mentoring style? How effectively are chosen mentoring strategies supporting the beginning teacher's development? What mentoring strategies are you using (or should be using) to develop a beginning teacher's autonomy? et cetera.

Effective mentor–mentee discussions form the basis of a strong mentor–mentee relationship and provide waypoints to support a beginning teacher's developmental journey of becoming an effective teacher. Therefore, you need to ensure that these discussions do not only rely on lesson-debriefs on a lesson taught by the beginning teacher and/or discussions on some topics needed to be taught in the upcoming lessons. Rather, they should also involve a range of conversations. Such conversations could range from home- and work-life balance to pupil-related issues inside and outside the science classroom to attaining teacher standards to pedagogical-oriented discussion and discussion of issues and solutions related to making science learning accessible for all the pupils. One way of establishing effective discussions is by recounting your own experiences and listening to a beginning teacher's real-life experiences as scenarios or stories. Sharing experiences in this way could allow you and the beginning teacher to incorporate reflective talks on prior learning, teaching, and evaluating practices by discussing the impact of such practices in their current and upcoming teaching lives. Thus, some tasks in the book ask mentors and beginning teachers to share their real-life experiences with each other and with other staff members. In addition, this book offers some example scenarios or stories as case studies, for a mentor to reflect on their mentoring strategies and styles, some of which it is suggested you share with a beginning teacher. These case studies are from within school settings, including accounts from the anonymised science mentors, beginning science teachers and pupils.

It is important that a mentor acknowledges that becoming a teacher is an emotional business. Therefore, you need to maintain a positive mentor–mentee relationship. For example, listening to a beginning teacher more and talking less boosts their confidence and provides a source of positive energy through appreciating their effort and employing constructive discussions. It could be an emotional business for the mentor too. So, it is vital that you do not overwhelm yourself and the beginning teacher you are mentoring by committing to unrealistic expectations from each other. Further, it is essential that you reflect on your impact on the beginning teacher and simultaneously encourage them to share positive and/or negative emotions

with you when they arise rather than leaving it far too long to be appreciated and/or to be dealt with.

Modelling best practices is one of the essential aspects of a mentor, as a beginning teacher tends to follow in their mentor's footsteps to develop their planning and teaching practices. So, as a science mentor, you should model yourself as a scientific activist promoting scientific literacy for all the pupils. You can achieve this by not only displaying ways of planning and teaching science to pupils within the recommended science curriculum, but also incorporating sources other than the science curriculum, such as using pedagogical strategies used in the (science) education-based secondary literature in your country and beyond, including exciting discoveries presented in science-based podcasts and introducing news items in the classroom related to science et cetera. Further, you need to model these best practices by allowing a beginning teacher to co-plan and co-teach lessons with you.

Additionally, this modelling of best practices by the mentor should not be one-off as the development of a beginning teacher is a gradual process. Therefore, you need to reflect and model ways by which you build your knowledge, skills and understanding regularly. For example: How do you bring, and use, innovation into science classrooms? Do you regularly reflect on your teaching practices based on pupils learning? Do you regularly modify your plans according to the learning needs of pupils? Do you keep a reflective journal like your beginning teacher? What continuing professional development (CPD) courses do you attend? What other leadership roles do you practice? What role do you play in establishing partnerships with other local schools, university, museums, industry and with local/regional science-bodies (such as the Royal Society of Biology, Royal Society of Chemistry and Institute of Physics)? and how do you seek to develop the issues/solutions of science education at a global level? et cetera.

It is important that you keep a growth-oriented approach to mentoring a beginning teacher, with a mindset of developing an autonomous teacher over time. This approach and associated mindset require you to initially give more support to a beginning teacher in planning, teaching and evaluating their classroom practices, and then gradually lowering your support over time, with an increase in a beginning teacher's responsibility and autonomy in their classroom practices. For example, you provide more support when a beginning teacher is planning and teaching parts of the lessons (micro-planning and micro-teaching). You then lower your support

when a beginning teacher is planning and teaching a series of solo-lessons. The support lowers further when they are planning and teaching parts of the science curriculum's units of work. To achieve this growth-oriented approach, it is also important that you help a beginning teacher to extend their ability to evaluate their practices based on self-reflections, feedback from lesson observations from you and other experienced teachers and pupils' feedback. Moreover, using your professional judgement and expertise, you support a beginning teacher in setting their developmental targets during their early stages of development. However, over time with more autonomous control, a beginning teacher should be allowed to set their developmental targets themselves with less support from you.

A growth-oriented outlook of a mentor needs you to not only support a beginning teacher to achieve the teacher standards to attain a QTS, but it is also be aimed to develop a beginning teacher as a life-long learner. Therefore, you need to direct the beginning teacher to extend their development by getting involved with CPD opportunities to upskill their learning and teaching practices. Moreover, you need to consider supportive ways to make a beginning teacher part of the school community, such as by establishing relationships, team-working skills and leadership activities with the other staff members of the school beyond their usual day-to-day practices in the science classroom/laboratory. This can be achieved by involving a beginning teacher in the school's community to create inclusive teaching, learning and leadership practices, in accordance with the school's developmental plans, for example, to improve the school's learning and teaching procedures to cater to all the pupils with varying learning needs. An inquiry could involve the beginning teacher observing and shadowing teachers and individual pupils, making field notes and reviewing reflections to be discussed with staff members on, for example, how misconceptions among pupils have risen from the subject knowledge taught in the classrooms. How do experienced science teachers tailor needs for special education needs and disability (SEND) pupils, within a full class context? How do teachers, as leaders and staff with leadership roles, contribute to the need for education for all pupils?

Finally, I will end this book by saying that the support given in this book would potentially develop you to recognise yourself and be known by a beginning teacher as a teacher educator rather than a classroom-teacher. The difference is that a classroom-teacher with mentoring responsibilities helps a beginning teacher with routine practices, assists in mirroring

some teaching exercises, shares pre-planned lessons and resources, and provides some emotional support. On the other hand, a teacher educator-oriented mentor sometimes does what a classroom-teacher would do, but primarily acts as a developmental advocate of a beginning teacher, who can converse and model the how and why of teaching interwoven with a growth-mediated outlook of developing an autonomous and effective science teacher with a lifelong learning attitude.