A critical evaluation of in-service professional development programmes for novice science teachers: Omani stakeholders' perspectives

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Dedication

This humble work is gifted to the spirit of His Majesty the late Sultan Qaboos bin Said bin Taimur, may God rest his soul, the dearest and most perspicacious of men, founder in 1970 of modern Oman and ruler until his death in 2020, who devoted his life to serving Oman and its people and to fostering peace in the world. Omanis will not forget your great interest in education and scientific research. Oman's people will not forget that you led them for fifty years, nor will they forget your famous promise to them when you took power in Oman that your first concern was education and that you would teach the people of the country even under the shade of trees. You have fulfilled your promise. May you rest in peace.

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Finally, I pray that Almighty God will help me to serve my homeland, Oman, and to participate with my colleagues working in education in all countries of the world in improving the education services provided to our students so that they may become good citizens of the world.

Abstract

This mixed-methods study evaluates the new policy of the Omani Ministry of Education (MoE) on providing professional development (PD) programmes for novice science teachers (NSTs) by eliciting the views of key stakeholders and investigating their enactment of the policy.

Data were collected by document analysis, individual interviews and a questionnaire. The interviewees were twelve policymakers from MoE headquarters, plus thirty policy implementers and forty-four NSTs from six of Oman's eleven educational governorates: Musandam, Al-Dhahirah, Dhofar, Al-Sharqiyah South, Muscat and Al Batinah South. In addition, 399 NSTs completed the questionnaire.

The findings indicate that some participants were satisfied with the MoE's new policy on the PD of NSTs and its aim of achieving a higher level of student performance, but that there was uncertainty among stakeholders regarding the planning and implementation of the policy and the role of actors in the educational governorates (educational supervisors and training centres) and schools (principals, senior teachers and colleagues) in delivering the policy. The study also reveals the existence of basic challenges facing stakeholders in implementing the policy, such as the development of subject knowledge, administrative problems and the provision of support to NSTs during the early years of their teaching careers. Finally, it is found that professional learning communities have not yet been established and become active in Omani schools.

This study has made many contributions to knowledge and methodology that can be considered an enrichment of the literature, both by broadening the understanding of the PD of NSTs in relation to policy enactment in the Middle Eastern context and by providing additional evidence that illustrates some of the issues identified in other countries to support a number of conclusions, such as the uncertainty surrounding the policy on the professional development of NSTs, the challenges to the PD of NSTs and their implications, and the use of mentoring and professional learning communities. Finally, it contributes to developing the concepts of novice teachers, policy transfer and teacher agency.

Table of Contents

List of Tables

List of Figures

Abbreviations

CPD	Continuing professional development
DCD	Directorate of Curriculum Development
EAD	Educational Assessment Development
HRD	Human Resources Development
MoE	Ministry of Education (in Oman)
NST	Novice science teacher
NTP	New Teacher Programme
PD	Professional development
PDP	Professional development programme
PIRLS	Progress in International Reading Literacy Study
PLC	Professional learning community
SIPTT	Specialized Institute for the Professional Training of Teachers
TIMSS	Trends in International Mathematics and Science Study
TOSD	Technical Office for Studies and Development

Chapter 1

Introduction

1.1 Focus of the research

This study focuses on investigating official policy in Oman on the professional development (PD) of novice science teachers (NSTs), as one of the means of developing the education system at the level of practices within school classrooms, thus positively influencing various aspects of student achievement.

The professional development of novice teachers has gained widespread attention in different contexts because of its implications for the maintenance of teacher quality through the delivery of safe and continuous professional development programmes (PDPs) (Alatas 2019, p.90; Bailey 2015; Breaux and Wong 2003; Feiman-Nemser 2010; Fenwick and Weir 2010). In rapidly evolving contexts such as the Omani school system, initial PDPs cannot provide sufficiently effective and modern teaching methods as well as covering all school-related issues. This has been one of the reasons for the emergence of many models and studies that have sought to support novice teachers. Indeed, it has been proven that PDPs in their various forms, official and unofficial, can have a positive and significant impact on the implementation of new education policies and on students' learning, in addition to changing teachers' attitudes and practice (Al Shabibi and Silvennoinen 2018; Ingvarson, Meiers and Beavis 2005; Saunders 2014; Villegas-Reimers 2003).

In addition, PDPs or support programmes for novice teachers aim to provide them with services that enable them to face the challenges which they face in the early years of their teaching and which are one of the reasons why some teachers leave the profession after only a few years (Clifton 2011; Ingersoll, Merrill and May 2012; Kozikoglu and Cokuk 2017; Pogodzinski 2012; Sali and Kecik 2018). Ultimately, failure to support novice teachers so that they remain and flourish in the teaching profession will be reflected negatively in their students' outcomes, since the skills needed to compete in today's world depend on science, technology, mathematics and engineering, and researchers have found that the most important factor affecting students' educational achievement is the quality of the teaching that they receive (Boyd et al. 2009; Carver and Feiman-Nemser 2009; Pogodzinski 2012).

In the Sultanate of Oman, the new PD policy adopted by the Ministry of Education (MoE) is operationalized by the Specialized Institute for the Professional Training of Teachers (SIPTT), which is the body responsible at the national level for planning, implementing and evaluating PDPs for teachers and other state employees in the field of school education. The establishment of the SIPTT in 2014 was an integral part of the comprehensive review of education policy in the Sultanate, which also included the establishment of the National Centre for Measurement and Evaluation, the Office of School Performance Evaluation, the Office of Professional Licensing and the Office for the Classification of Private Schools. The purpose of this structure of national bodies is to guarantee the quality of services provided in the education system of the Sultanate (Al Jabri, Silvennoinen and Griffiths 2018; MoE 2018a).

The aim of the SIPTT is to build a strong base of teachers, senior teachers, school principals and educational supervisors who embrace the modern teaching methods and curricula necessary to raise the level of student achievement, which is done through the professional development programmes and policies provided by the Institute (Education Council 2012). One element of the SIPTT's PD policy concerns specifically the professional development of novice science teachers, with the aim of enhancing the knowledge, skills and attitudes of NSTs in relation to the teaching process and of supporting them with everything they need at the beginning of their careers. To this end, the policy "focuses on constructivist methods; inquiry-based learning and creative approaches to teaching" (Al Jabri, Silvennoinen and Griffiths 2018, p.90).

1.2 Aims and research questions

The present study aims to evaluate the new policy of the MoE in Oman on the professional development of NSTs by eliciting the views of key stakeholders and investigating their practice of the policy. This thesis pursues this broad aim by addressing three more specific research questions, stated and explained below.

RQ1: Why did the MoE consider the creation of a new policy for the professional development of novice science teachers necessary, and with what specific objectives and anticipated outcomes?

To address this question, it was necessary to consider the content of the MoE's policy on the PD of NSTs, but its focus is on the Ministry's interest in this group

of teachers and the internal and external factors that led it to adopt a new policy on their professional development. It was also necessary to consider the three levels (MoE's Headqurate - Governorate - School)) at which PDPs for NSTs are delivered, according to policymakers, with particular attention given to the SIPTT as the source of the new policy.

The consistency between MoE policy on PD and its application at the intermediate level of the provincial governorates is addressed by the second research question:

RQ2: What are the key stakeholders' expectations of the current professional development provision for novice science teachers and how do these compare with the MoE's policy objectives?

This question can be seen to refer to several interrelated objects of enquiry: stakeholders' expectations of the levels of professional development delivered to NSTs and their relation to the achievement of policy objectives; key PD topics proposed for inclusion in the NSTs' induction programme and the methods of implementation; and the expectations of NSTs themselves as to the support associated with their PD provision.

Various aspects of the new policy have been explored in order to gain a deep insight into stakeholders' expectations. These include their expectations regarding interventions and methods of solving problems arising during the early years of teaching and their expectations as to how the PDPs would cover different areas such as the curriculum, assessment methods and new teaching trends. Evidence was collected from the perspectives both of officials (policymakers at the MoE and policy implementers in the governorates) and of NSTs themselves, in order to examine the quality of PDPs and to compare this with stakeholders' expectations.

RQ3: From the perspectives of key stakeholders, how successful has the policy been in terms of implementation and impact on the professional learning and practice of novice science teachers?

The final research question focuses on two key aspects of perceptions regarding the policy on PD for NSTs from the point of view of stakeholders: the extent to which they perceive the policy to have succeeded in implementation and impact, and the similarities and differences among the three stakeholder groups

(policymakers, implementers and teachers) in terms of these perceptions. The first issue has been addressed by investigating three sub-questions: Does the new policy work? Is its implementation effective? Do NSTs perceive it as meeting their needs? Finally, a comparative analysis was conducted of the various stakeholder groups' perceptions of the success of key aspects of the policy.

1.3 Significance of the study

Oman's novice teachers account for more than 13% of all teachers. Educational statistics issued by the MoE indicate that it has hired thousands of teachers annually since 2012 in order to provide qualified teachers in all governorates (MoE 2015b). Science teachers make up the largest percentage of teachers in Oman. MoE statistics show that there are 10,363 science teachers throughout the governorates, representing 18% of the total number of teachers in MoE schools (MoE 2018b). The Ministry seeks to provide NSTs with the knowledge and skills necessary to play an effective role in the learning process and to that end, it has established a training centre in each of the eleven governorates of the Sultanate in order to provide educational support to all teachers, including NSTs. These centres aim to assist NSTs to address the difficulties and educational issues they face when first appointed through in-service PDPs (MoE 2010b). The recent establishment of the SIPTT as the central body responsible for delivery of these programmes represents the Ministry's new policy on the professional development of NSTs (MoE 2018a).

Despite the importance of these PDPs, there has been no investigation into their benefits for novice teachers (MoE 2014b), a research gap which the current study aims to fill. It will also investigate the urgent need for this type of professional development and for new policy initiatives, as the MoE hires novice teachers in remote areas to achieve the Omanization policy, creating a need to develop training programmes and to establish training centres in the governorates. This study also has a significance beyond Oman in that insights into what makes the in-service professional development of teachers effective is of interest to all countries of the world, because teachers everywhere require in-service PD.

This study represents real significance for research for the following reasons: It has the potential to inform stakeholders, namely policymakers and implementers, as well as researchers in the planning and implementation of professional

development programmes for novice teachers in general and for NSTs in particular.

Given the paucity of research published in the Omani context on the evaluation of PD policies, this study is the first to evaluate the PD policy pursued by the SIPTT, which is considered one of the most important policies on which the MoE relies to improve the educational services provided to students and to achieve advanced levels in international comparisons. The investigation is also distinguished by the participation of all groups of stakeholders concerned with PD policy in the Ministry itself and from ten different bodies, which gives it a scope unique in the Omani context.

As the MoE is in the process of conducting a broad assessment of education policies in Oman, the results of this study will provide an introduction to a number of issues related to policy reform, to the activities of novice teachers and to the challenges facing them. Its findings also offer an Omani cultural perspective on the use of current knowledge to develop policies on the PD of novice teachers, which is undoubtedly an issue of importance in the global literature.

1.4 Motivation and position of the researcher

My practical interest in the issues affecting novice teachers began in 2000, when I was the headmaster of a school in a village near the city of Nizwa in the Al-Dakhiliya Governorate. In that period, the MoE started implementing a policy of replacing foreign teachers with Omani nationals. As a result, my school received eight novice teachers in various disciplines, who together comprised 20% of the total teaching workforce of the school. These novice teachers displayed enthusiasm and a willingness to work, but the school's administration faced three particular challenges related to their appointment. The first was that the skills of these teachers were different because they had graduated from different institutions and that some of their skills and knowledge were inconsistent with the school's work rules. The second issue was that as school administrators, we were obliged to place the burden of an unduly heavy workload on some novices, due to the school's situation. For example, we had only one chemistry teacher, a novice, on the payroll, which meant that this inexperienced teacher had to take all of the chemistry classes in the school, including those 12th-grade students studying for the equivalent of AS and A-level exams, despite having insufficient

experience in dealing with such students and despite being only four years older than them. The third difficulty arose from the lack of senior teachers in the school to provide the necessary support and guidance to the novices during this difficult period at the beginning of their careers, because the school's planning situation did not allow the appointment of senior teachers. Together, these three issues led me at an early stage to encourage discussion within the school and to begin a dialogue with the education authorities of the governorate about providing solutions to novice teachers' need for support, because I realized that if these issues remained unresolved, this situation would negatively affect the level of student achievement.

My interest in the provision of support for novice teachers increased after I was appointed in 2008 as director of the Educational Supervision Department at the MoE's headquarters, because this body was responsible for supporting, evaluating and proposing appropriate PDPs for teachers in cooperation with the authorities in the governorates. During that time, I tried with my colleagues in the department to provide teachers, especially those working in remote and isolated schools, with various forms of support. In 2010 I was transferred to the post of director in the Rehabilitation and Training Department, where my period of office coincided with the so-called Arab Spring, a series of political events which created great pressure on the governments of the Arab Gulf states, including Oman.

One response of the Omani leadership to the demands of the people was to decree that 50,000 citizens of the Sultanate be appointed to posts in various sectors of the state, including education, to replace expatriate workers. It was decided that the contribution of the MoE to this policy would be the recruitment of 8,540 Omani teachers, which involved the relaxation of the Ministry's existing selection criteria for novice teachers as a basis for appointment to a teaching post. During that period, the Ministry therefore took specific and strict measures to provide novice teachers with the necessary teaching skills before sending them into schools, one of which was the introduction of a placement test for all novice teachers. After analysis of the results of this test, a professional development programme was offered to all novice teachers, with full salary, lasting for one full semester and comprising 350 hours of theoretical and practical training. I was made responsible for planning and implementing this programme, an experience which strengthened my interest in the PD of novice teachers. Twenty years of

cumulative practical experiences in the educational field led me in 2016 to seek to strengthen my expertise by following an academic research pathway. In particular, I was able to pursue doctorate study in the field of educational policy, giving me an invaluable opportunity to benefit from an enhanced understanding of models of the PD of novice teachers.

My position as a researcher can be seen from two perspectives: that of the insider, defined as a member of the group to which the research is applied, and that of the outsider, or non-member of that group (Merton1972). Trowler (2016) indicates that the internal researcher is a person who works in the institution being researched. However, he asserts that researchers can investigate areas and people within the institution that were not previously known to them.

I can be considered to have acted in this study as both an insider and an outsider researcher. I was an insider because of my experience in the MoE and my dealings with governorate officials in different sectors, based on the work I had done previously. I found that my status as an insider researcher helped me to achieve access to a thorough and broad understanding of the context of the study when conducting the fieldwork. I also consider myself an outside researcher, however, because I ended my working relationship with the Ministry in the teacher training sector more than four years ago, before beginning to collect the data. In addition, I have never worked for the SIPTT, the subject of the study, and did not know most of the trainers and officials working there.

This ambivalence contributed to the balance of my position as a researcher. I had the advantages of the internal researcher in knowing the location and patterns of interaction within the organization, understanding its culture and relying on my network of relationships to reach the participants easily and quickly, while avoiding the defects associated with insider research, including taking some of the issues raised by the participants for granted (Mercer 2007). I also felt myself to be a researcher from abroad and my distance from the MoE for several years contributed to developing my skills and experiences in noticing some issues in teacher training that I had not noticed before.

During my doctoral research, I tried as much as possible to invest my presence in a country that is considered to have one of the more advanced education systems in the world. The directives of my supervisors and the faculty members of the School of Education at the University of Leeds to postgraduate research

were not limited to the implementation of a study plan, but extended to my interaction as a PhD researcher with the educational context in the country of study. These directives motivated me to participate in many conferences held at the university level and that of the White Rose University Consortium, and in two external conferences, one in Italy and the other in the USA. I also attended a large number of educational gatherings related to teachers implemented by the researchED project, as well as three annual gatherings of the TeachFirst organization. In addition, I became a member of the NASUWT trades union and of the National Education Union and took part in some events organized by them, according to my circumstances and potential. All of these experiences, in a different context, contributed to broadening my perspective on issues affecting teachers, especially novices.

As I approach the end of my PhD journey, which like the British weather has been varied and at times unpredictable, I have become ever more strongly motivated to share the experiences and skills I have acquired in the UK with my fellow stakeholders in Oman. I also feel that this thesis marks the beginning of the academic research and publishing stage in relation to novice teachers.

1.5 Philosophical and methodological issues

This is an interpretative study with an ontological structure in which individuals seek to understand the world in which they live to develop subjective meanings of their experiences toward specific things (Creswell 2012). Ontology is described as relativism based on local social and experimental data, with specific foundations in nature (Klenke 2008). In this study, ontological parameters relate to actors in politics at the three levels within the Ministry of Education in Oman, where the minds of stakeholders are formed through a culture of context and organizational practice.

Many textbooks distinguish two main research paradigms, namely the scientific and interpretive paradigms. Scientific research takes a positivist stance, adopting an objective view of the world and searching for truth through reality, whereas interpretative research takes a constructivist viewpoint according to which the researcher cannot be separated from the context in which he is searching, since the source of information is his own subjective perceptions (Briggs, Morrison and Coleman 2012; Robson and McCartan 2016; Thomas 2017). My own knowledge

and experience as insider researcher, in reality, form part of this research because they add value to an understanding of how to elicit information from stakeholders and policy documents.

Interpretive or qualitative research relies on “induction, discovery, exploration, theory/hypothesis generation, the researcher as the primary instrument of data collection and qualitative analysis”, while scientific research is essentially quantitative and relies on “deduction, confirmation, theory hypothesis testing, explanation, prediction, centralized data collection, and statistical analysis” (Johnson and Onwuegbuzie 2004, p.18).

An alternative to taking a purely quantitative or qualitative approach is to adopt the pragmatic paradigm, in which the two are combined to produce a mixed research approach, as has been done in the present research. Schoonenboom and Johnson (2017) describe pragmatism as characterized by “warranted assertibility”, meaning the ability to gather strong evidence on the claims related to the subject being investigated. Denzin and Lincoln (2011, p.83) also explain that “pragmatism is the research paradigm that supports mixed or multiple methods of social research”. Therefore, this study has used quantitative and qualitative approaches in succession to explore deeper and broader responses from stakeholders regarding the policy on PD for NSTs in the Omani context. Further details of the methodology adopted are given in Chapter Four.

1.6 Key terms

Ministry of Education: The MoE is the branch of central government in Oman responsible for schooling and for administering the education system within the eleven governorates.

The Specialized Institute for the Professional Training of Teachers: The SIPTT is an administrative body located centrally within the headquarters of the MoE whose responsibility is to plan, implement and evaluate professional development programmes offered to teachers, school administrators and educational supervisors, in cooperation with the relevant directorates at the Ministry’s headquarters and the directorates of the educational governorates.

Stakeholders: These are the people involved in the creation and exercise of the MoE’s professional development policy. For the purpose of this study, they are divided into three categories: (1) policymakers, comprising officials in four

directorates of the MoE; (2) policy implementers, namely officials in the governorates, supervisors, senior science teachers and trainers; (3) novice science teachers.

Novice science teachers: NSTs are teachers newly appointed to teach science subjects in MoE schools. In the context of the present study, the MoE documents offer no specific definition of the concept of a novice teacher. In order to study the effects of PDPs provided by the MoE for NSTs, the term 'novice teacher' is applied in this study to every teacher employed by the MoE who has taught for one to three years. I have chosen this term to distinguish between new teachers (i.e. those who were appointed to MoE schools in the current academic semester) and experienced ones (all remaining MoE teachers). Since the Omani government has emphasized science education, it is logical to focus on the training of science teachers. There are three categories of science teachers in Oman's educational system, divided into three cycles.

Teachers in the early years of their professional careers are referred to in the literature by several different terms, including 'novice teachers', 'beginning teachers', 'new teachers' and 'newly qualified teachers' (Anderson 2000; Ingersoll and Smith 2003; Peters 2006; Maciejewski 2007). Davis and Cearley-Key (2016) use these terms interchangeably, while other researchers refer to the this stage by reference to the number of years of experience; for example, some researchers use these terms to refer only to the first year of teaching (Poom-Valickis 2014; Lambson 2010; Roberson and Roberson 2009), while Semingson and Smith (2015) use the term 'novice teacher' for one who "typically has zero to three years of teaching experience and is a newcomer to the teaching profession". Similarly, Davis and Cearley-Key (2016 , p.294) describe novices or new teachers as being in "the first through third years" of their employment. Finally, some researchers consider a novice teacher to be one who has five or fewer years of experience in teaching (Ingersoll and Strong 2011; Simos 2013).

The MoE awards permanent contracts to newly qualified teachers if they pass a written employment test, with their score on the test determining the type of school to which they are assigned and the subject which they are required to teach. Thus, novices whose score qualifies them to teach at a Cycle One school will teach science and mathematics (the second field) to students aged 6-10 years in grades 1-4; NSTs allocated to a Cycle Two school will teach science at

grades 5-10 (11-16 years); and those with the highest test scores will teach their original specialization (physics, chemistry or biology) to students aged 17-18 years in a post-basic education school (grades11-12).

This study considers all three educational levels, because NSTs are distributed across all of them, depending on school vacancies, without their newly-appointed status being taken into account. Moreover, the PDPs provided for all such teachers focus on knowledge and skills, and their application in school laboratories.

Professional development programme: PDPs are programmes of training activities of various kinds that are provided by the MoE through the SIPTT in the main training centre at Ministry headquarters, in training centres in the governorates and during visits by educational supervisors, in addition to training activities provided in schools, whether workshops or supervisory visits by the principal or the senior teacher for the purpose of support and assistance.

Governorate: This is an administrative division in the Sultanate of Oman corresponding to a geographical region consisting of several *wilayat* or provinces. In each *wilayah*, based around a town or city, there are separate schools for males and females in various grades. There are eleven educational governorates in Oman, each headed by a governor-general who reports directly to the Minister of Education.

Educational supervisors: These are members of staff with long experience, deep knowledge of the subject and other aspects of pedagogy. They are based in educational governorates and make regular visits to schools to provide support and assistance to teachers of a particular subject in the curriculum. This role corresponds to that of an inspector in some other education systems.

Senior teachers: These are teachers with great experience, knowledge of a subject and other pedagogical skills, who are considered to be resident supervisors within the school. They are appointed by the MoE, on the basis of specific criteria, to be responsible for all aspects of their subject of specialization in the school, whether related to the support and evaluation of teachers, to student achievement or to the curriculum. They are not usually required to teach more than twelve weekly lessons. Their role corresponds to that of head of department or middle leader in other education systems.

The Technical Office for Studies and Development (TOSD) is the body within the MoE responsible for granting permission to conduct research and surveys. It has its own ethical considerations.

1.7 Organization of the thesis

This thesis consists of nine chapters. After this introduction, Chapter Two outlines the context of the education system in Oman and issues related to official professional development policy. The third chapter provides a comprehensive review of the literature related to the topic of the study. Methodological issues, including research philosophy and methods of data collection and analysis, are dealt with in Chapter Four. The fifth, sixth and seventh chapters report the findings, each addressing a specific theme with the aim of providing a complete answer to each of the research questions stated above. Chapter Eight is a discussion consisting of two parts, the first discussing the main issues emerging from the study and the second considering its contribution to knowledge. The ninth chapter concludes the study and examines its implications.

Chapter 2

Study Context

2.1 Introduction

This chapter begins by describing the importance of this study to the researcher and its importance in general in Oman, then it introduces the policy of professional development at the MoE, because the study revolves around this topic. Next, it sets the study against the background of the education system in Oman, considering issues related to the PD of teachers in general and NSTs specifically, as well as the role of training centres. The chapter concludes by Challenges facing policy on the professional development of NSTs.

2.2 Geographical background and its relevance to education policy

The Sultanate of Oman is an Arab country in the Western Asian part of the Middle East. It is the third-largest state by area in the Arabian Peninsula, located in the southeast of it. Its total land area is 309,500 km^2 and it has a population of 4,647,995. Omani nationals constitute 58% of the total population, while the remainder are mainly guest workers from India, Pakistan, Bangladesh, Egypt, the Philippines and other countries (NCSI 2020).

Throughout history, Oman has witnessed several attempts at colonization, by Persian, Portuguese and English powers. In each case, Omanis supported the central government's defence of its sovereignty, but these external ambitions combined with civil wars to keep Oman in isolation. In 1970, known in Oman as the Year of Renaissance, His Majesty Sultan Qaboos bin Saeed (may God have mercy on him) assumed power in a country surrounded by ignorance, disease and poverty on every side. At that time, there were only three all-male schools in Oman, exclusively for the sons of the rich and those living close to those schools, and only 12 beds to treat patients, donated by the American Mission. The young Sultan, may God rest his soul, declared in his first speech to his subjects: "The most important thing is education. We will teach our children, even under the shade of a tree."

Since those humble beginnings in 1970, the Omani education system has progressed to an estate of 1170 schools in 2020. Initially, girls were denied the right to enrol in formal education, whereas today there are four women serving

as ministers in the national government and holding doctorates from the most prestigious international universities. These successes did not come easily. A prominent feature of the late Sultan Qaboos's rule was a centralized approach to governance, intended to direct the state's resources to the development of the country in the face of difficult geographical conditions on one hand and of secessionist tensions in some provinces in the early days on the other. This centralizing policy has been reflected in all sectors of the national economy, including the education sector, so that for the past fifty years a top-down management system has governed all aspects of the education process, including the professional development of teachers.

2.3 The education system in Oman

As outlined above, a state education system has been in place in Oman for only half a century. Before 1970, formal schooling was provided by three primary schools, in the governorates of Muscat and Dhofar, where 30 male teachers taught 900 boys. However, this situation changed significantly after His Majesty Sultan Qaboos took power and the central government began the process of developing public education for all classes of society in all eleven governorates (MoE 1987; Al-Hammami 1999; MoE 2012b; MoE 2004a).

The Ministry of Education was created in 1970 and made responsible for all educational matters in Oman. In the same year, a free public education system was established, consisting of 12 grades divided into three stages: elementary school (grades 1–6), preparatory school (grades 7–9) and secondary school (grades 10–12). The key challenges facing the MoE at that time were to ensure the availability of school buildings and of teachers; therefore, an intensive programme to build new schools was implemented.

The Human Development Report (United Nations 2010) indicates that since the Year of Renaissance, Oman has shown progress in the Human Development Index. High school enrolment has quadrupled the literacy rate and life expectancy has increased by 27 years compared to 1970. One hundred percent of children of both sexes now have the opportunity to obtain a basic education and the 2010 World Bank report (cited by Al Balushi and Griffiths 2013) describes the development of the education system in Oman from 1970 to 2010 as "unprecedented in any other country". Four stages can be identified in the

development of the Sultanate's formal education system. The first, from 1970 to 1994, was marked by an emphasis on infrastructure and the spread of education to all Omani villages. The second stage, the improvement of the education system, was marked by the introduction of the basic education system. The third stage started in 2012, when the late Sultan announced the importance of reviewing and evaluating the education system in order to improve student outcomes. The fourth stage began when his successor, Sultan Haitham bin Tariq, took office in 2020 and announced the stage of enabling education in order to contribute to the implementation of the Oman Vision 2040 project.

Despite the progress achieved in educational infrastructure, in terms of the enrolment ratio between the sexes and the access to education of all villages, and despite the MoE's efforts to qualify Omani nationals as teachers at all levels, it was found at the end of the second stage that the education system had not been strengthened sufficiently to raise student achievement to the desired level. Various official reports and studies attributed this failure to three main factors: First, the curriculum was found to be overcrowded with content which was weakly presented in ways that did not engage the interest of students (New Zealand Education Consortium 2013). The second factor was the emphasis on the theoretical side of teachers' professional development and the use of traditional methods of teaching (World Bank 2012). Finally, educational evaluation was marked by a focus on summary goals and formative evaluation (New Zealand Education Consortium 2013).

2.4 The development of teacher training in Oman

In the early days, the educational workforce was heavily dependent on teachers from other Arab states, while the small number of Omani teachers were mostly untrained and relatively poorly qualified. The rapid increase in the number of students and schools required the MoE to focus on the PD of teachers in order to ensure that their training was commensurate with the modernization of Oman's education system. Thus, the MoE took responsibility for developing the skills and abilities of teachers, especially Omanis, by putting them through PDPs.

It was necessary to appoint Omani teachers in order to involve them in the leadership of their educational institutions and allow them to contribute to the educational process. Two teacher training institutes were established in 1975:

one for males and one for females. These accommodated graduates from the ninth grade who studied over two years to qualify to teach at primary school. In 1984, these institutes became colleges, which began accepting students after Grade 12 to study for two years in order to gain a teachers' diploma, again qualifying them to teach at primary level (MoE 2010b). Helping Omanis to enter the field of teaching has been a ministerial policy since the beginning of the Omani Renaissance. The MoE (1987) set out the following expectations for its effects:

> *The entry of trained Omani nationals into the teaching force will have a considerable impact on the system. Such teachers are likely to be more committed than contract expatriate teachers, and better able to develop a productive rapport with the students. This will especially be the case where such teachers return to their own villages, towns or regions. (p.4)*

Sultan Qaboos University, the first public university in Oman, opened in 1986 and its College of Education was one of the first colleges to qualify students to teach. It could be said that the Omanization policy was introduced to the field of education in the 1980s.

The MoE's fifth five-year plan (1995–2000) represented a significant educational transformation in Oman. It established a higher education sector and the responsibility for preparing teachers was moved from the MoE to the Ministry of Higher Education. It also upgraded colleges of education from diploma to bachelor's degree level, in order to prepare their graduates to teach in preparatory and secondary schools. More significantly, 1995 marked a shift from quantitative expansion to the qualitative improvement of education and signalled the beginning of a period of educational development in accordance with a vision for the sustainable economic development of the country (MoE 2004a, p.27). Based on this vision, the MoE began to prepare for the implementation of a new Basic Education system to replace the general education system. By the end of 2010, all children in grades 1–4 were studying under the new system (MoE 2010b).

The first basic education graduates entered post-basic education in the 2007–2008 academic year. The post-basic education curriculum is organised on a 'core plus elective' model, where students are allowed to choose their courses. These two years were intended to prepare students for higher education or entry into the labour market (MoE 2012b). Figure 2.1 represents the structure of the Omani

education system and shows that the MoE is responsible for supervising all public and private schools in grades 1-12.

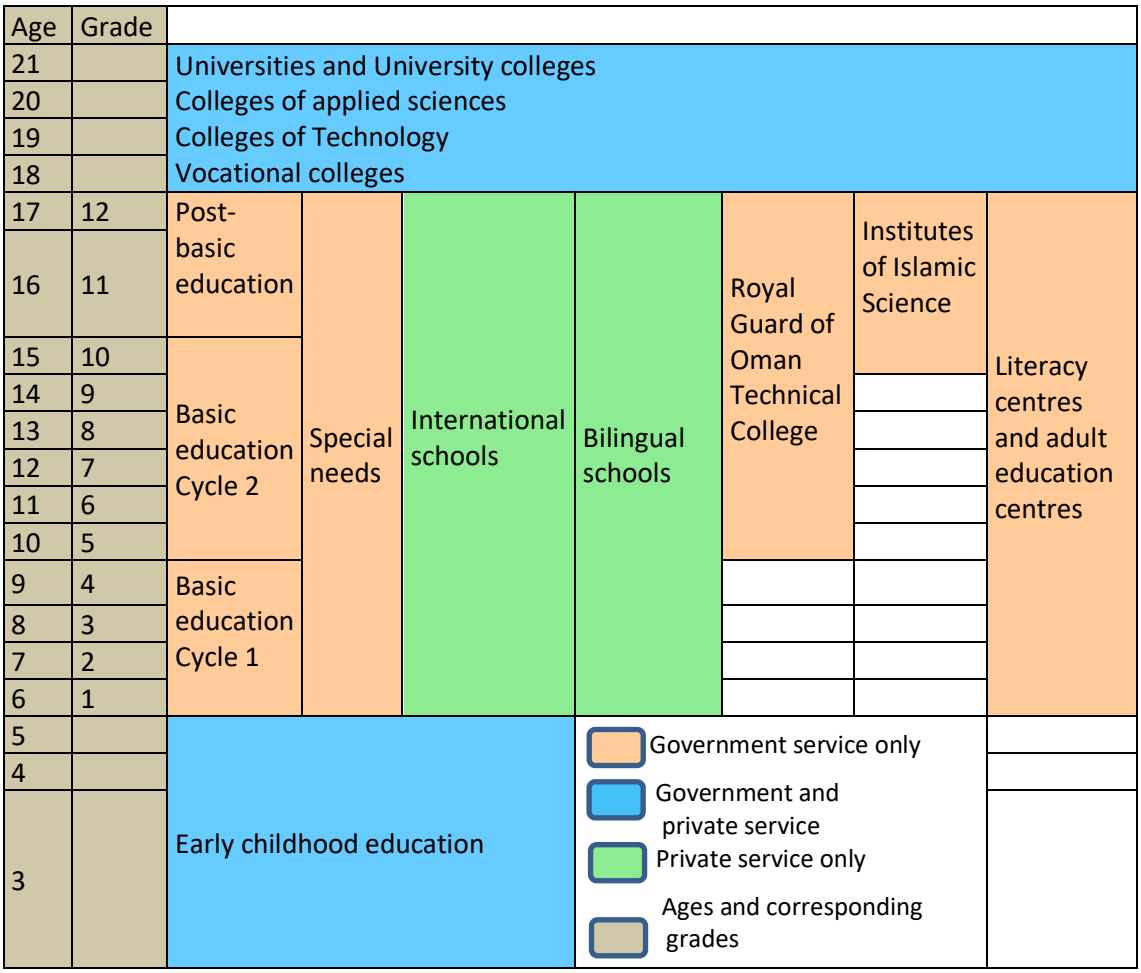


Figure 1.1: Structure of the Omani education system

This transformation of Omani education, known as the education development phase, included various aspects of MoE's purview, such as "school buildings, national education goals, curricula, teaching methods, administrative structures, supervision and assessment of student performance" (Al-Lamki 2009, p.45). As a result, the MoE adopted an in-service training mechanism that teachers were required to complete before beginning to teach in Basic Education schools (Al-Lamki 2009).

The expansion in the number of schools and of students, along with the introduction of new services designed to improve the educational service in the Sultanate, significantly increased the demand for Omani teachers, which meant that many more needed to be recruited. In response, the decision was taken in 2003 to allow Omanis to join the teaching profession after studying for a bachelor's degree in education at higher education institutions outside the

Sultanate. This policy contributed to the intensification of professional development efforts for novice teachers in order to provide them with skills and knowledge appropriate to the nature of the education system in Oman.

2.5 Professional development programmes at the MoE

The MoE seeks to enhance the quality of teaching through its educational training centres, which deliver PD for all teachers, including novices. In-service PDPs for teachers are provided under the Ministry's auspices at three levels (MoE 2014a):

At the central level, training is delivered through teacher development programmes according to the latest developments in education. This training is conducted at the MoE's central training facility.

At the governorate level, there are training programmes at governorate training centres, where teachers acquire the knowledge and skills required to improve the education process.

At the school level, the MoE treats the school as a training unit, to provide some general training programmes.

Training is now also delivered by the Specialized Institute for the Professional Training of Teachers, a central body administered within the headquarters of MoE whose responsibility is to plan, implement and evaluate professional development programmes offered to teachers, school administrators and educational supervisors, in cooperation with the relevant directorates at the Ministry's headquarters and the directorates of educational governorates. The SIPTT was established in 2013 with the aim of providing long-term PDPs in order to enhance teachers' performance by equipping them with the skills and competencies they need to keep pace with global developments in the teaching profession. This institute and its relationship with the three levels above are the focus of this study.

Figure 2.2 represents these PDP levels and the role that the MoE plays in the training of teachers in various categories.

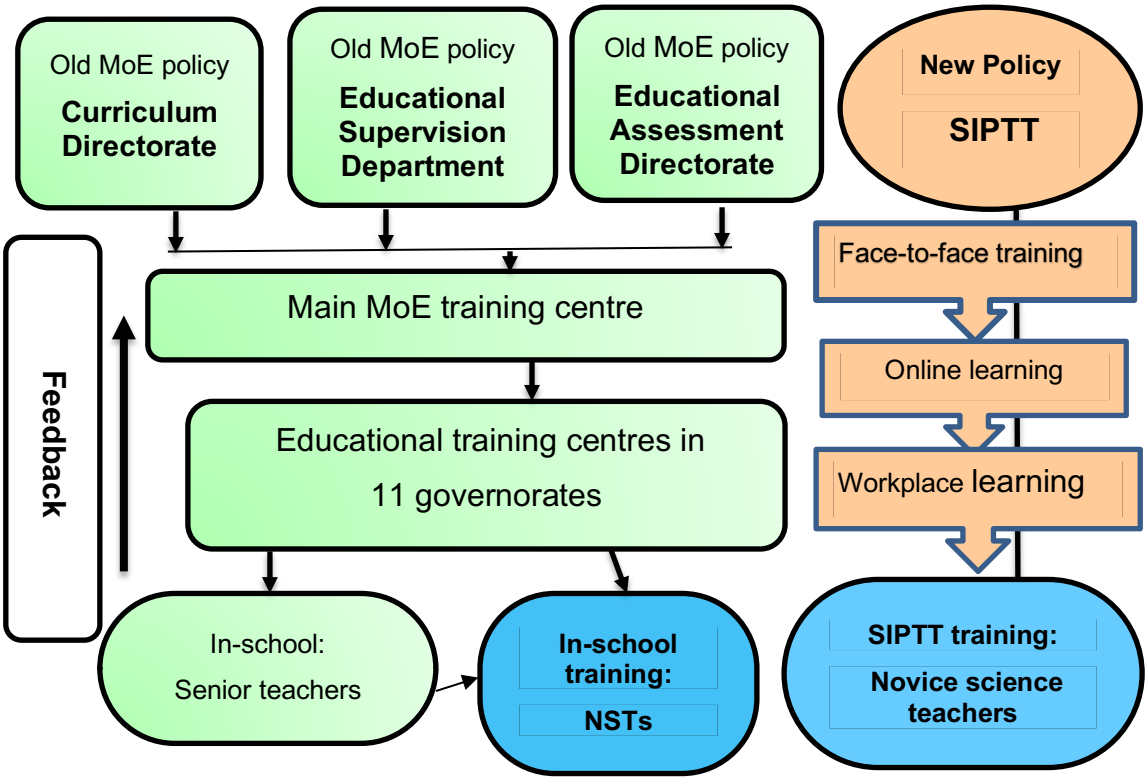


Figure 2.2: The MoE's professional development system for teachers

2.5.1 The current policy of professional development in the MoE

Until the end of 2018, the Ministry of Education had two policies in planning and implementing PDPs for teachers in general, including novice science teachers: the old policy of using a cascading training system and a new one whereby the SIPTT trains teachers at its central premises. Figure 2.2 illustrates these two policies, showing the three main levels of training under the former. The first level includes training activities planned by the MoE through its Educational Supervision Department, Educational Assessment Directorate and Curriculum Directorate. Therefore, the old training model could be regarded as a top-down one, reflecting the centralized policy of the MoE (Al-Hinai 2007; Al-Lamki 2009). As the box in the lower left indicates, feedback on the training process was sought, but this did not allow teachers to make decisions regarding their own training needs. The third important characteristic is the MoE's use of a cascade training style, which involved providing training to individuals who, in turn, would provide the same training to others (Craft 2002). For example, the main training centre at the first level in the MoE used a cascade model for in-service training and identified trainers in all governorates in order to train teachers centrally. It

also instructed them to return to their governorates to replicate the training programmes with all teachers (MoE 2001, p.89).

Focusing on in-service teacher training as part of educational reform in Oman, the MoE created 11 training centres to provide various training courses to its employees, especially teachers. These local training centres in each governorate were supplied with trainers, rooms and equipment in order to facilitate access to training for all teachers (MoE 2014a). Moreover, PDPs were implemented through annual PD plans, prepared for all categories of employees, including novice teachers at MoE. These annual plans are some of the most important sources of information in this study, as will be discussed further in Chapter Four.

Reports issued by the MoE indicate the level of interest in PDPs among teachers (MoE 2012a; MoE 2013a; MoE 2014a; MoE 2015a; MoE 2016b; MoE 2017; MoE 2018b). Table 2.1 shows the numbers of programmes offered in the annual training plans of MoE from 2011 to 2018 and the percentage of teacher programmes.

Table 2.1: Number of programmes offered in the annual training plans of MoE 2011–2018

Year	Number of employee programmes*	Number of teacher programmes	Total number of training programmes	Percentage of total programmes for teachers
2011	266	599	865	69.24
2012	359	896	1255	71.39
2013	353	743	1096	67.79
2014	399	966	1365	70.76
2015	294	716	1010	70.89
2016	316	508	824	61.65
2017	285	538	823	65.00
2018	280	407	687	59.00
Total	2552	5373	7925	67.79

Sources: (MoE 2012a; MoE 2013a; MoE 2014a; MoE 2015a; MoE 2016b)

* Administrators and technicians in schools and governorates

The number of teacher training programmes listed in Table 2.1 may be taken to indicate the Ministry's interest in the PD of teachers in all categories and all specialties, as these are the only kind of PDPs for teachers under the current policy. This study aims to answer questions about the training programmes

offered to NSTs, including their adequacy and regularity and whether they meet the expectations of NSTs and of other stakeholders employed by the MoE.

The following points should be taken into account in interpreting Table 2.1:

- The MoE creates an annual training plan that includes training programmes for all governorates and assumes the centralized authority of the MoE in the training sector.
- Despite differences among governorates in the numbers of teachers and their expertise, the same quality of training is implemented in all governorates.
- Teacher training has received more attention in the annual plans compared to other categories of MoE employees.
- Fluctuations in the numbers of programmes provided to employees from year to year are related to the decline in the number of training programmes, although MoE statistics indicate that increasing numbers of teachers are being recruited annually; for example, 1704 new teachers were employed in the 2018–2019 academic year, compared with only 1350 in 2017–2018 (Alsophi 2017).
- The evaluation reports for the annual teacher training plan do not indicate the number and quality of training programmes offered to NSTs in the six governorates involved in the study.

Under current MoE policy, the implementation of professional development programmes for NSTs in the governorates operates through three basic mechanisms: delivery at governorate training centres, regular visits to novice science teachers by educational supervisors and the provision of in-school support to NSTs by principals and senior teachers. Training centres in the governorates play the main role in the delivery of PDPs to NSTs, who receive face-to-face training in dedicated training rooms. These facilities are also used to train educational supervisors, school principals and senior teachers in the mechanisms for providing support to teachers, including NSTs.

Among the challenges facing these training centres are the abovementioned annual increase in the number of teachers being recruited, the failure of some teachers to attend training programmes because of the long travel times between schools and training centres, the shortage of trainers in all disciplines and a lack of training equipment. I have seen first-hand evidence of all of these challenges and some of them have been confirmed by studies conducted in the Omani

context. For example, in cooperation with a team from New Zealand, the MoE (2014b) conducted a study which found that Omani training centres faced three challenges: the assignment of novice teachers to remote areas, limited access to the internet and appropriate technology in teacher training centres and a lack of technical and administrative expertise in the centres. In an earlier collaboration with the World Bank, the MoE (2012b) noted nine problems afflicting teacher training in Oman:

- Lack of training programmes for teachers.
- The limited classroom experience for teachers in teaching.
- Weak content and lack of focus on the quality of teaching in training programmes.
- Lack of peer-to-peer support for novice teachers or teachers' associations.
- Hiring of new teachers in schools in remote areas.
- Limited financial and administrative powers granted to the training centres.
- An absence of systematic data on the effects of training programmes on teachers' classroom practice.
- Failure to link attendance at training programmes to promotion or salary increases.
- The persistence of the cascade model, impoverishing the content of training programmes.

A third study, conducted in collaboration with a team from the University of Cambridge (MoE 2013b), divided training problems at the MoE into two categories, related respectively to their structure and to their content. Three structural problems were identified: 1) the inability of the main training centre to identify the training needs of teachers due to the current top-down approach; 2) the relationship between the different training levels in MoE is not always effective due to communication barriers that exist between them; 3) the lack of links between the MoE and international PD institutions delivering teacher training qualifications such as the Cambridge International Certificate for Teachers and Trainers. The study also identified two problems of content, namely that in-service teacher training programmes were too theoretical and that insufficient time was allocated to teaching practice.

The difficulties referred to in previous studies have negatively affected the quality of training offered to teachers in general and to NSTs specifically. On the other

hand, while these studies adequately describe the deficiencies of teacher training in Oman, they do not address the causes. Furthermore, these studies have not evaluated the training centres in the governorates or the quality of the programmes offered to teachers, especially novices. Finally, previous studies have not proposed PDPs for NSTs or other novice teachers. Therefore, the current study is novel in its focus on the way that these issues are dealt with in the new policy.

The introduction to Section 2.5 refers to the MoE's policy of providing professional development programmes for novice science teachers at three levels. It also notes a change of policy in 2013, with the establishment of the SIPTT (originally named the Specialized Centre for the Professional Training of Teachers and assuming its current name, adopted for simplicity throughout this thesis, in late 2019), which began delivering programmes for teachers in 2014.

Several questions arise from the Ministry's adoption of a new policy on the management of PDPs for teachers, including novice science teachers:

- Is there documentary evidence of a written MoE policy on the training of NSTs or is it wholly or partly unwritten?
- What are the factors that led the Ministry to adopt the policies described above?
- How are these policies implemented in the governorates?
- What is the role of the training centres in the planning and implementation of these policies at governorate level?

The desire to address these questions led me to conduct this study of the Ministry's new policies.

2.5.2 The new MoE policy on professional development

Omani students' poor outcomes in the Progress in International Reading Literacy Study (PIRLS) and the Trends in International Mathematics and Science Study (TIMSS) has been a major concern for the Sultanate's education policymakers. In maths, TIMSS assesses students' competence in three cognitive skills: "knowledge recall, the application of knowledge in solving problems, and the ability to reason in working through problems" (TIMSS Math 2011). In 2011, results in Oman were unsatisfactory in all three skills. Only 20% of the Omani

students participating in the study reached the ‘intermediate’ level, which can be considered the acceptable minimum, whereas the international average was 69%. In the same year, more than half of Omani students (54%) were below the ‘low’ level, compared to an international average of only 10%. Similar scores were registered in science and reading in the fourth and eighth grades (TIMSS 2011). Discussion of these results, which were considered totally unacceptable for a society witnessing a qualitative shift in education, coincided with the implementation of the education evaluation phase of Omani educational reform, with the aim of improving student outcomes. Indeed, a comprehensive review of the education system in Oman led to the adoption of a number of initiatives intended primarily to improve student performance.

Among these initiatives was a radical change in the MoE’s policy on the professional development of teachers, leading to the establishment in 2013 of the SIPTT, whose role was represented as addressing two main issues: the variable quality of newly appointed teachers and the urgent need to effect a fundamental change in the classroom by training teachers to use modern teaching methods. The SIPTT started its work by selecting Omani trainers from the educational field according to specific criteria, then training them to a high level of professionalism in order to ensure that they acquired the theoretical and practical skills needed to become effective trainers. At the same time, the Ministry rented a building to serve as the temporary headquarters of the Institute, containing 56 training halls, a library, a science laboratory, meeting rooms, separate male and female prayer rooms and a restaurant. The building was also equipped with the necessary devices and equipment to receive large numbers of trainees.

To ensure a direct impact on student performance levels and achieve the necessary developments in the classroom, the SIPTT’s priority was to design specific programmes to support learning in reading, writing, science and mathematics, because these subjects form the basis for comparing the performance of Omani students in international tests and because competence in science and mathematics is important for the future of the national economy. Specifically, the SIPTT designed nine programmes representing new policies on the PD of educational workers and including the NST programme, by contracting with well-known international institutions in each of the nine areas. The nine programmes, whose implementation started gradually in 2014 (Al-Jabri,

Sylvanwenen and Griffith 2018; Al-Shabibi and Sylvanwinnen 2018; Ministry of Education 2018a), are these: Senior Teachers' Programme, School Leaders' Programme, Subject Supervisors' Programme, Arabic Language Experts' Programme, Science Experts' Programme, English Language Experts' Programme, Mathematics Experts' Programme, Second-Field Experts' Programme (Science and Mathematics) and Omani Novice Teachers' Programme.

Omani Novice Teachers' Programme. This was designed by experts from the University of Turku in Finland. The programme described here is a general one for newly appointed teachers of all specializations taking up their first position in schools affiliated with the MoE. It is of shorter duration than the other programmes, comprising four training periods of five training days each over a single year. Its general aim is to develop the performance of novices to the point where they become effective and creative teachers who are able to learn modern teaching methods and apply them to improve learning opportunities for all students in their classes. The first period of the programme introduces participants to international best practices in teaching and explores how to adapt and apply active learning strategies in their lessons. The second period then focuses on higher-order thinking skills, investigative learning, planning to take into account individual differences and creating stimulating learning environments while employing smartphone technology within the classroom. During the third period the focus is on the participants' subject disciplines, as it aims to deepen and enrich their understanding of learning strategies that have a global impact in particular disciplines. The fourth and final period is concerned with application and professionalism, so that novice teachers acquire a range of strategies of evaluation for learning. It also aims to develop participants' ability to address their own professional learning needs after completing the programme.

The above nine programmes offered by the SIPTT have specific criteria for enrolment and mechanisms of evaluation, whereby each participant is required after each training period to submit an achievement file containing samples of the teacher's products and a comprehensive report of all elements of the training period. This file usually includes study plans, educational resources, professional development activities and educational films that have been used in assessment and feedback from students and colleagues. Each participant is also asked to

submit a report of 3000 to 5000 words showing that they have learned and understood the content of the training period, providing evidence of the skills they have acquired in analysis, evaluation and reflection and demonstrating their ability to link these to their practice by providing examples from their school environment.

As illustrated in the right-hand column of Figure 2.2, the SIPTT uses three modes of delivery of its PDPs: face-to-face, online and at work. In the first mode of delivery, participants receive direct face-to-face training in the Institute's premises, attending 20-30 training days divided into 4-6 training periods at the rate of three training sessions per day. The second is e-learning, where the participants of the programme meet remotely via an electronic learning platform, each having been supplied for the purpose with a laptop computer and an internet connection chip. This method, focusing on knowledge and concepts, encourages cooperation among participants. The content is delivered by a wide range of interactive methods including the use of forums and professional dialogues. The online platform is also considered an effective means of communication between trainer and trainees throughout the training period. The third mode of delivery is learning in the participants' own work environment, with a focus on practical application and on conveying what they have learned in the end-of-period report.

In order to achieve the goals of its PD policy, there must be effective cooperation among all three levels at which the Ministry of Education operates, namely the SIPTT, the governorates and schools. It is also important to involve all stakeholders. For example, when the Institute asks the governorates to nominate teachers to attend a face-to-face training programme, the senior teacher, school principal and educational supervisor of each teacher must have knowledge of the background to the programme, its importance and its content, so that they can support the teacher during the implementation of the programme, rather than hindering him in implementing at school the skills that he has acquired from the Institute. In addition, each teacher has the right, before joining the programme, to know the programme plan and all of the duties and responsibilities required of her in order to prepare herself and her students for the periods during which she will be absent from school. There will also be preparation at a domestic level, since the teacher will often be required to travel long distances and be away from her family for six days in each training period. These administrative procedures,

although simple, are in my view of great importance for the teacher and the school; implementing them appropriately will reduce the likelihood of teachers, especially female ones, declining to attend SIPTT programmes.

2.6 The MoE's interest in science and NSTs

Science and its branches are among the most important subjects in the education system in Oman. The fourth dimension of the human resources development strategy inspired by the government's vision for the Omani economy (1996–2020) focused on providing the necessary facilities for the scientific specializations needed for economic development (MoE 2007). When the basic education system began in Oman, the MoE developed a study plan for grades 1-12 and increased science education from 635 to 1200 hours per year (MoE 2001). It also developed science curricula for all grades, built school science labs, provided other resources for science education and trained science teachers to keep up with this change. In the 2017/2018 academic year, as one of its educational development initiatives to improve the level of student performance, the Ministry began applying the Cambridge Science and Mathematics Series as a new curriculum, in cooperation with the University of Cambridge. Moreover, at the beginning of the academic year 2020/2021, the study plan for teaching science and mathematics at the MoE is to be changed, so that the general science subject for the ninth and tenth grades will be divided into the three basic subjects: physics, chemistry and biology. The number of science lessons for ninth and tenth-grade students has also been raised from four to six per week, according to Ministerial Resolution No. 11/2020. In addition, the MoE has expressed interest in extra-curricular activities in the sciences, based on its belief in the importance of such activities in raising the level of student learning in these subjects. For example, there is a science club in every school, as well as supervisory staff in every governorate providing support to all schools in terms of science and innovation, including robot clubs. As of the academic year 2017/2018, the Ministry has operated in 45 schools the STEM OMAN programme, in cooperation with the British company Rolls Royce, which owns the rights to the programme. This involves thirteen diverse science-related activities, experiences and interactions aiming to provide interactive fun for students, encouraging them to analyse and draw conclusions about many of the processes that take place around them, in

order to derive logical explanations that will help to simplify their learning of science.

On the national stage, the Oman Science Festival is held every two years. Many companies, institutions and organizations from the Gulf region, other Arab countries and all around the world are drawn to participate in this event that attracts teachers and students from many schools in Oman. During the five days of the festival, several workshops and educational presentations are held. Finally, in March of each year, the MoE, in cooperation with educational governorates and private sector institutions, hosts the National Week for Science, Technology, Engineering and Mathematics, designed as a platform to stimulate and support teachers, students and those interested in science, technology, engineering and mathematics through a range of activities presented in a template of fun and suspense.

All of these activities reflect the Ministry's policy of providing diverse forms of support for the professional development of science teachers in general and NSTs in particular, with the aim of enriching Omani teachers with PDPs of many types that will contribute to raising the level of student performance in the science subjects.

2.7 Challenges facing policy on the professional development of NSTs

The World Bank (2012) reports a 2009 survey of 150 teachers in five educational governorates of Oman which identified complaints about four aspects of the in-service professional development programmes offered to them:

> *The training is over-theoretical with an absence of practical applications, the training does not address issues which the participants regarded as important, the trainers are not sufficiently knowledgeable of the content they deliver, and the courses are too short to have a lasting impact on their teaching*. (p.130)

The report also notes a reluctance and indifference among some teachers to take seriously the PDPs offered to them at MoE facilities, in the governorates and at school, because they saw them as having no implications in regard of salaries and promotion. In addition, supervisors and school administrators were not seen to choose teachers to attend training programmes on the basis of training need, so that they were often made to attend training programmes unrelated to the subject matter or which repeated training that they had already received (World Bank 2012).

The New Zealand Business Confederation (2013) reported evidence of low morale among teachers in Oman, especially males, and identified several factors mentioned by teachers as affecting their morale, such as “the impact of policy implementation on working conditions, poor salaries and benefits granted to teachers, low levels of motivation due to the systematic lack of systematic recognition of the achievements of the teacher” (p.282).

In a more recent study, Al Shabibi and Silvennoinen (2018) identify a set of ten challenges facing the education system in Oman and impacting the professional development of teachers, as follows: the poor performance of Omani students in TIMSS and PIRLS; the abnormally large gap between the weak results of boys and those of girls, who outperform them at all levels and in all subjects; wide differences in schools’ performance due to school leadership; very poor student performance in remote areas; teachers’ lack of skill in using formative assessment methods, so that results are unrealistic and do not represent their students’ performance; teachers’ ineffective use of student-centred learning methods; differences between institutions in their pre-service preparation programmes for novice teachers; poor preparation of expatriate teachers, especially in class management skills and modern teaching methods; the lack of status and accountability in the teaching profession in Oman; and much lower expectations of the performance of their students among male teachers than among female teachers.

A World Bank study in collaboration with the MoE (2012b) indicates that newly qualified teachers require a formal introduction to the realities of teaching in Omani schools. It also affirms that novice teachers face several difficulties during their first years of work, such as problems related to classroom management, student assessment and addressing individual student needs. The researchers emphasize that “teacher education can no longer be seen as a single period of training, but must be an on-going process throughout the teacher’s career” (MoE 2012b, p.129). Despite the widely recognized importance of novice teachers’ training, I was unable to find any programmes dedicated to this category of teachers when I reviewed the programme contents and target groups listed in Table 2.1.

The study by the World Bank and MoE highlighted the complaints of teachers who were being sent on courses they considered irrelevant or containing familiar

material, which proved to be a waste of time and resources. Participating teachers also complained that the training materials might not have been delivered as intended, in terms of amount and depth, due to the cascade training model (MoE 2012b).

In light of the establishment of a new MoE policy to manage professional development programmes for teachers, including novice science teachers, the following questions arise:

- Are there any documents referring to a written or unwritten MoE policy on the training of NSTs?
- What are the factors that led the Ministry to adopt the policies described above?
- How does the Ministry implement these policies in the governorates?
- What is the role of the training centres in the planning and implementation of these policies in the governorates?

Consideration of these questions led me to study the Ministry's new policies.

2.8 National education policies and the dominance of international organizations

A reason for developing educational policies in Oman and other countries in the Middle East ~~is~~ has been a response to the influence of international organizations such as the United Nations Children's Fund (UNICEF), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Organization for Economic Cooperation and Development (OECD) and the World Bank.

An example of such international influence has been the creation of international league tables of student performance, such as the Programme for International Student Assessment (PISA), PIRLS and TIMSS, and an obligation on the part of the Omani Government to introduce policies and assessment tools to raise the attainment standards of Omani students in these tests (see also Section 2.5.2, p.37).

As a consequence, discussion of these results with international organizations led to a comprehensive review of the education system in Oman and the adoption of a number of initiatives intended primarily to improve student performance,

including a radical change in the MoE's policy on the professional development of teachers, leading to the establishment the SIPTT in 2013.

There is an ongoing conflict between the objectives and motives of international organizations regarding the moral and material purposes of education (Jones, 2007). Some bodies, such as UNESCO and UNICEF have focused on the moral purpose, promoting education as a right that every child on earth should attain their full potential according to their individual capabilities. In 2015, the United Nations set 17 life-changing goals that included these global goals, also known as the Sustainable Development Goals (SDGs), the fourth of which was education quality, the aim being to ensure that "education enables upward socioeconomic mobility and is a key to escaping poverty" (United Nations, 2015). UNESCO has been committed to aligning its programmes and activities with the 2030 Agenda for Sustainable Development of the United Nations and the 17 SDGs (UNESCO, 2017). Most recently, UNICEF, in accordance with its strategic plan, *"Every Child Learns' Education Strategy 2019-2030*, has been identified as one of its five areas ~~in which~~ for achieving its sustainable development goals" (UNICEF*,* 2019*).*

In contrast, some international organizations have focused on material policy objectives, seeking to shape the social, economic and educational policies of many governments, exerting their financial strength in terms of loans and project finance helps to impose their will. Among the most prominent of these institutions are the World Bank and the OECD. The World Bank, through its loans, has been able to influence the rapid expansion of formal education systems in all continents of the world and has also contributed to promoting the idea of correlation between education and economy, and a key role for education being to serve the interests of capitalism and economic development. The World Bank financing of long-term educational projects, particularly in developing countries, cannot be isolated from the fact that it is a bank based on the principle that the ability to lend depends directly on the ability to raise capital (Jones, 2007).

In the Omani context, the assessments made by the World Bank in 1995, 2012 and 2017 led to many local customs being ignored in favour of the requirements of technological innovation and use in society. Western-style education was imposed without taking into account the cultural sensitivities of the Omani context, which is based on an educational philosophy derived from Islam and traditional

social customs and norms; for example, in attempts to reduce budgets allocated to education items while increasing teachers' workload.

The OECD, through its flagship PISA program, has also contributed to transforming education into a tool for promoting the market economy and economic growth (D'Agnese, 2018). The OECD describes PISA as "a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students" (OECD, 2016). D'Agnese (2018) asserts that PISA is not just an educational evaluation tool with a specific purpose but a tool for shaping education in all countries of the world. Grek (2009) argues that through the use of statistics, reports and studies, the OECD has achieved an unparalleled brand, as its recommendations are accepted as valid by politicians and experts alike, and that the education indicators provided by the OECD are taken for granted. Grek's assertion ~~agrees~~ concurs with Woodward's analysis, which suggests that the OECD has become the "premier supplier of educational statistics and sculptor of education policy agendas worldwide" (2010, p.99).

The above scenario leads to what is called "governing by numbers" (Grek, 2009), where the number has an "unmistakable political power within technologies of government" (Rose, 1999, p.197). These statistics and numbers push countries to permanent comparisons with others, thus creating a permanent competition based on this PISA ruling for education (Novoa and Yariv-Mashal, 2003).

In fact, these evaluations are not limited to measuring performance in terms of learning outcomes, but also include the performance of the teacher being measurable according to a system of performance standards and evaluations (Holloway and Brass, 2018). Consequently, the evaluation and measurement techniques emanating from these organizations not only control education systems but also seek to produce new types of teachers (Ball, 2003).

Performance indicators of the OECD countries have become benchmarks for Omani policymakers in adopting any educational policy. In the Omani context, PISA, PIRLS and TIMSS indicators have become a a priority for some policymakers, while teachers' professional development has become based on improving student attainment in terms of these international standards. A primary concern is that many pressing educational issues related to the Omani context are not given equal importance.

2.9 Summary

This chapter has provided insights into the importance of PDPs for NSTs at the beginning of their careers in the Omani context, in order to understand the implications of the MoE's policy on the professional development of novice teachers. It has explored specific challenges in providing PD for NSTs in Oman. Therefore, the literature on the PD of novice teachers and of NSTs in particular, which is reviewed in Chapter Three, provides an appropriate theoretical framework for this study.

Chapter 3

Literature Review

3.1 Introduction

The start of the professional journey of any novice science teacher is likely to be accompanied by both enthusiasm and fear. The NST will be enthusiastic because embarking on a working career is the beginning of an important new stage in an individual's life, especially in the context of Omani society. As for fear, NSTs and novice teachers of other disciplines will go through a difficult stage and will face considerable pressure and challenges during their first years of teaching, because teaching is a complex process and its assimilation cannot be completed during the first few months of a professional career (Farrell 2008). Kim and Roth (2011) point out that learning to teach is a continuous process, as it includes gradual familiarization with the mechanisms of working at the class level, as well as balancing the demands of the people who interact with the novice teacher in the school, especially during the first years of teaching (Farrell 2012).

In this chapter, I will discuss the literature which forms the theoretical background to the study, examining issues related to policy on the professional development of NSTs. The review considers the development of education policy, the factors to be considered and the multi-level implementation of policy, before turning to PD policy and more specifically to policy on the PD of novice teachers and the particular needs of NSTs. There follows a detailed review of literature on the support provided to NSTs via PDPs, by professional learning communities, through mentoring and in terms of the teacher agency model. An analysis of the challenges reported in the literature as facing those embarking on a teaching career is followed by a review of the few studies of PD for teachers conducted to date in Oman, which identifies a number of research gaps to be filled by the present study.

3.2 Education policy development

As this study focuses on investigating the MoE's policy on the professional development of NSTs, it is appropriate to begin by discussing the concept of policy. One of the many definitions of the term 'policy' is as "a course of action or principle adopted or proposed by a government, party, individual, etc.; any course

of action adopted as advantageous or expedient" (Shorter Oxford English Dictionary on Historical Principles 2007, p.2268). According to Hill and Varone (2014), policy can be a decision, or it may take the form of a set of decisions or a trend. Colebatch (2009) notes that the concept of policy is used in different ways and that the word has more than one meaning, as it can refer to a broad trend, a practice, a value statement or a commitment. Educational policy can be defined as a bureaucratic tool through which expectations for education can be managed (Henry et al. 2013), while this study takes the concept of procedural policy to mean the programmes and activities offered to NSTs by the SIPTT and officials in the governorates and schools with the aim of developing them professionally during their first three years of teaching.

Ball (2006) argues that there are two different perceptions of politics: as text and as discourse. He asserts that policy texts are rarely the work of a single author or a single production process; nor are they necessarily complete, clear, or closed, being the product of a conflict between the legislative formulation and the interest group. Politics as discourse, by contrast, represents the practices constituting the topics addressed by the texts of politics, which cannot be reduced to language and speech alone. Foucault refers to policy discourse as "the set of conditions in accordance with which a practice is exercised, in accordance with which that practice gives rise to partially or totally new statements, and in accordance with which it can be modified" (1986, p.208).

Among the types of policy discourse, a school's discourse is formed to produce "good teachers", as clear messages are conveyed in the corridors and facilities of the school, in the classrooms and teachers' rooms, about the characteristics of a good teacher stipulated in school books, reports and brochures, which is a form of integration between politics as text and politics as discourse (Maguire et al. 2011).

Ball (2015) adds that textual work is more than rhetorical work, which means that the focus is more on what was written and was previously said, rather than on how to practice and shape those texts and make them applicable. In the Omani context, although many of the documents issued in the past four decades contain policy texts calling for the reform of professional development programmes for teachers in general, these texts did not have any realistic practice at the school

level until after the appearance of reports by international organizations focusing on such PDPs.

Among the terms referring to the concept of change in education, ‘reform’ is used to describe large-scale national changes (Wedell 2009). Documents published in English by the Omani Ministry of Education related to professional development use the word ‘reform’, whereas in its Arabic publications the Ministry prefers a word whose literal translation is closer to the English word ‘development’. The same applies to all documents related to various other sectors in the Ministry. This indicates that the terminology of educational change has been affected by translation between Arabic and English, reflecting the preference for Arabic discourse in the Omani context. I will therefore use the term ‘development’ instead of ‘reform’ in this thesis.

The development of education policy generally depends on specific factors such as national demands, economic aspirations, political positions and international pressures, among others. These factors differ in the development of educational policy, depending on the context and the specific time, as mentioned in Chapter Two. Therefore, it is noted that the factors that lead to the development of education policy are multiple and varied; for example, Cookson (1992) presents a review of the development of educational policies in 27 countries around the world, exemplifying the influence on education policy development of various factors, including national demands and economic, political and social conditions. This link confirms the fact that developing educational policies in any context is an ongoing process and not a one-time activity (Morrison 1998).

There are several reasons for developing education policies in any context. Wedell (2009, p.15) mentions four of these, namely “to increase the equality of opportunity within society as a whole”, “to enable the national education system to better prepare its learners for a changing national and international reality”, “to use the announcement of educational changes for some kind of short-term political advantage” and “to make the education system more clearly accountable for the funding it receives”. In fact, the first three reasons are consistent with the Ministry’s objectives in establishing the SIPTT, which represents its new policy on the PD of teachers. Through this policy, the Ministry seeks to provide the largest possible number of opportunities for professional development programmes to different sectors of the educational community, especially

teachers. Contributing to preparing an elite group of teachers familiar with modern teaching methods will also undoubtedly enhance the efficiency of the education system in Oman and facilitate the creation of a distinguished generation of learners. In addition, the Ministry needs to gain the trust of teachers in general, because they represent 69% of its total workforce (MOE 2018a) and because of the financial crisis that Oman is going through due to the recent fall in oil revenues, reflected in an increased weekly teaching burden for teachers on one hand and the cessation of financial promotions for all Ministry employees including teachers on the other.

A fifth reason can be added in the context of Oman and other countries of the Middle East: It is a response to requests for policy changes submitted by international organizations such as the World Bank and UNESCO. In the Omani context, one of the World Bank's recommendations was to develop the Ministry's policy on the mechanisms for the professional development of employees, including teachers (MoE 2012). Therefore, it can be argued that policy on the PD of NSTs in Oman is the result of a combination of internal factors and recommendations from abroad.

Education development policies are described in terms of the complex relationship between policy and practice (Fraser et al. 2007; Richards, Gallo and Renandya 2001). This complexity is often not recognized by stakeholders, including policymakers and implementers, which leads to the belief that policy development can happen as soon as a three-day training workshop is implemented or as soon as written procedures for implementing the policy are sent to schools (Hoban 2002). Furthermore, it may seem simple to develop and propose an educational development policy and to write policy manuals and other documents, but the difficulty and complexity of the matter lie in planning to implement the policy and achieve its goals. The reason for this is that there are many different factors that interact with each other and influence the implementation of any education development policy. The next section highlights factors that should be considered in such an undertaking.

3.3 Factors to consider in developing education policy

Many contributors to the literature assert that some education policy development initiatives have not succeeded and that their objectives have not been met as

planned. For example, Nicholls (2018, p.14) asserts that “it is the implementation rather than the creation which presents certain difficulties and problems”, while Fullan, Cuttress and Kilcher (2005, p.54) argue that “a missing ingredient in most failed cases is appreciation and use of what we call change knowledge: understanding and insight about the process of change and the key drivers that make for successful change in practice”. In the same vein, Wedell (2009) cautions against implementing any newly developed policy as intended without directly involving the stakeholders who are most directly affected. Hargreaves (2001) suggests that some stakeholders may fear reforms whose purpose is not clearly stated and that this fearful response makes the development of education policy more difficult than it would otherwise be.

The above considerations can be seen as confirming a specific fact, which is that policy development can fail to succeed because of a gap between the principle of development (which represents policy) and its practice (which is represented by reality). This gap is often attributed to the fact that educational development initiatives often arise in contexts which are not the same as those in which they are to be implemented, or that they come from outside experts who are not familiar with the contextual details of implementation, or from local policymakers either who fail to involve other stakeholders in the planning of the policy or who have not been able to quantify the needs of practitioners as required.

Wedell (2009, pp.22-27) presents three factors that must be considered in order to avoid such disparities when starting to develop educational policy. The first factor, “starting where people are”, indicates that any development in education policy should be derived from the actuality of the context and from the actual needs of stakeholders, whether practitioners or implementers. The second is expressed as “identifying and communicating the need for change”, which refers to the importance of clarity in defining the purpose of development, not only for stakeholders at the highest level (the headquarters of the Ministry) but also for policy implementers (governorates, school administrators and senior teachers), in addition to those targeted by the implementation of the policy (novice science teachers in this study). The third factor to be considered is the need “to make a long-term commitment”, which means the commitment to provide the funding and support needed for implementation, whether administrative or technical support, for policy-targeted stakeholders (NSTs in this case).

Policymakers should have full knowledge, understanding and insight with respect to these three factors when beginning to plan for the development of educational policy, especially in centralized education systems, as is the case in the context of this study, which can be described as a system of education with a three-tiered hierarchical structure of ministry, provinces and schools. The next section duly considers the development of educational policy within such a multi-level system.

3.4 Educational policy development in multi-level centralized systems

In centralized education systems, the development of policy is not limited to a single level, but rather must take place at all levels, so that it starts with the policy being created and ends with its implementation, which involves the participation of stakeholders at all levels. Theoretically, policy on the professional development of NSTs adopted by the MoE in Oman, as a new policy on teachers' PD, should involve all organizational tiers under the authority of the Ministry.

Chapman, Mahlck and Smulders (1997, p.1) criticize the centralized nature of initiatives in education policy development as follows: "The education systems of most countries are highly centralized and major decisions on how quality should be improved are often made many levels away from the classroom, where the real process of education occurs", while Morrison (1998) asserts that there are many countries whose policymakers express a commitment to improving the quality of their education systems but face unexpected difficulties in bridging the gap between the commitment stage and implementation. Chapman, Mahlck and Smulders (1997, p.249) add that "the interests and knowledge of stakeholders at lower levels of the education system may differ meaningfully from those at the top".

The development of education policy in Oman operates at three organizational levels: those of the Ministry, the governorates and the schools. This corresponds to the triple model proposed by Fullan (2009), who identifies the three levels relevant to the context of the United States as those of the state, the district and the school and who stresses the need for systematic development of educational policy at all three levels. By the same token, Wedell (2009) argues that national policymakers must be aware of the entire context of change. Likewise, in the field of professional development, Guskey (2000) suggests that professional

development should involve three levels in the context of each country: policymakers, trainers and schools.

3.5 Policy transfer and borrowing

The issue of borrowing and transferring policy is one that should be discussed when talking about professional development policies. Mowat (2018) indicates that there is an increasing necessity, driven by some international organizations such as the OECD, to borrow policy from one international context for use in another. Thus, “similar education reforms and a common set of education policy jargon are being applied in many parts of the world, in locations that are incredibly diverse both culturally and in terms of economic development” (Verger et al. 2012, p.3).

Shields (2013, p.14) identifies the creation of economic growth as one the main reasons for borrowing education policy, “supported by a new body of economic theory defining the concept of human capital”. Another reason for such policy borrowing is the increased interest in indicators in the form of international league tables such as PISA, TIMSS and PIRLS, creating both local and global pressure on education systems throughout the world, with the aim of improving performance and appearing to be outperforming other countries (Ball 2003; Dumay and Dupriez 2014; Polesel, Rice and Dulfer 2014; Hodgson and Spours 2016; Mowat 2018). Boyumn (2014) also argues that the comparisons between educational systems resulting from the use of these indicators have become highly influential in shaping educational policy.

Dolowitz and Marsh (2000) allege that as a result, some governments have come to see the borrowing of policy from other countries as a solution to the problems and difficulties they face in their own education systems, as this borrowing is facilitated through global networks that market educational policies across the world.

There are therefore clear limitations and associated problems associated with international education transfer and policy borrowing that disregard the unique features of Omani context and culture. This has implications for facilitating education transfer and policy borrowing that results in genuine improvements and professional learning. One solution is identifying PDPs to raise the level of

teachers' performance in comparison with international educational systems and outside the Arab Gulf states with similar cultural contexts. Studies show that the metaphor of politics often ignores the political and cultural contexts, which raises the possibility of transferring policy and practice from one national context to another (Feniger and Lefstein 2014).

3.6 Professional development as an education development policy

The terms 'professional development' and 'professional learning' are used interchangeably in the literature to denote one of the most important aspects of educational policy development (Hauge and Wan 2019; Malderez and Wedell 2007; Postholm 2018; Wedell 2009). Guskey (2002) defines the professional development of teachers as comprising activities and processes designed to promote their acquisition of knowledge, skills, attitudes and beliefs in order to bring about qualitative changes in their classroom practices that improve student learning. In the literature, there are several models of teacher PD, such as professional growth (Clarke and Hollingsworth 2002), teacher change (Guskey 2002), teacher learning (Shulman and Shulman 2004) and professional development (Desimone 2009). Whatever term is used to refer to this concept, there is agreement that the PD of teachers is essential for developing classroom practice and improving measures of school performance, notably student learning outcomes (Borko 2004). It often occurs in formal settings such as professional development workshops, research groups and formal mentoring programmes (Timperley 2011), but it is important to recognize that teachers also learn by means of methods such as peer interactions or collaborative planning and mentoring among classmates within the school, which can be seen as a fertile environment for PD (Vescio, Ross and Adams 2008). Fullan (2007) assumes that vocational education in the context of the place of instruction is the only component which changes the practices that occur in the classroom. In addition, there is strong evidence that incorporating professional development programmes in teachers' subject areas achieves better results (Darling-Hammond and Richardson 2009). Moreover, schools with a strong professional learning community achieve a higher level of student achievement (Bryk 2010; Horn and Kane 2015).

3.6.1 Professional development for novice teachers

Today's novice teachers face more difficulties than before when joining the teaching profession for the first time (Brock and Grady 2005), because the roles that teachers now play differ from those in past decades and because the teaching profession has become more complicated (McNamara, Jones and Murray 2014). At this stage, two issues arise concerning the responsibilities of the novice teacher, the first related to the teaching that the novice does in school and the second to how the novice can learn to teach (Alatas 2019; Feiman-Nemser 2010). It is argued that the preparation that teachers receive in colleges and universities is no longer sufficient to handle these developments, because teacher education programmes have become focused on training in the theoretical aspects of their daily duties in school (Breaux and Wong 2003; Lampert 2010). Therefore, novice teachers have come to realize that they are not adequately prepared to face the real classroom environment (Breaux and Wong 2003).

It follows that it is important to support novice teachers in the early years of their careers (Kozikoglu 2017); indeed, Evans-Andris, Kyle and Carini (2006) found that novice teachers needed more technical help and support because their new job was overwhelming, emotionally demanding and not in line with their previous expectations. Conversely, failure to support novice teachers in the profession will lead to a failure of their students' learning (Alatas 2019). There are two ways to improve the teaching performance of novices, including novice science teachers: The first is through PDPs aimed at instructing trainees in subject content and related issues such as educational evaluation; the second is through official notes made by a person who is trusted by the NSTs (Brill and McCartney 2008; Wiebke and Bardin 2009).

Although professional development is important at all stages of every teacher's career, it is especially important for science teachers at the novice stage because they have great educational needs during their first years of work (Grimsæth, Nordvik and Bergsvik 2008). Knight (2002) affirms that novice teachers still have a great deal to learn at work, especially procedural knowledge (in other words, how to do things), which is a type of knowledge that grows through practice. In addition, the early work experiences of novice teachers have a major impact on shaping their attitudes towards the teaching profession (Ballantyne 2007), as well

as their practical performance in the classroom (Haggarty and Postlethwaite 2012) and their professional identity (Rippon and Martin 2006). Moreover, early teaching experiences are likely to determine a teacher's later decision to staying in the profession or to leave it (Kersaint et al. 2007). Taken together, these factors highlight the importance of professional development programmes offered to NSTs when they join the teaching profession.

Furthermore, the PD of novice science teachers, whether inside or outside the school, formal or informal, should be directed towards meeting their particular needs at this stage, in order to achieve the desired goals. The next section highlights this issue.

3.6.2 Needs of novice science teachers

There are many studies that have been concerned with the needs of novice teachers, including novice science teachers, and these have differed in their identification of the needs that must be met and the methods by which support should be provided to NSTs or novices in general, as well as in the justifications given for providing such support. However, studies in both non-Western contexts and Western contexts agree that it is vital for novices to receive solid support in the early years of the profession from their more experienced fellow teachers, school administrators and other early-career teachers (Hobson 2009; Howe 2008; Lee, Teo and Chai 2010; Lovett and Cameron 2011).

The literature identifies the following four explanations of novice teachers' need for increased attention and widespread support, some being logically based on the so-called deficit assumption (Feiman-Nemser et al. 2000). First, pre-service teacher preparation programmes fail due to an emphasis on the theoretical aspects of daily teaching assignments and simplified caricatures of teaching that do not reflect the complex reality of school culture (Olson and Osborne 1991; Lawson 1983). The second explanation is that some novice teachers have unrealistic beliefs as to how difficult a process teaching is, leading to a perceived inability to deal with student behaviour and classroom management (Hebert and Worthy 2001); similarly, the personal characteristics of some novice teachers such as shyness and uncertainty may prevent them from succeeding in teaching (Schmidt and Knowles 1995). The third reason is that some schools treat novice teachers just the same as experienced ones, burdening them with the same responsibilities and forcing them to learn through trial and error; unsurprisingly,

such schools often fail to retain their novice teachers (Darling-Hammond 1997; Hebert and Worthy 2001; Martinez 2004). The fourth factor is the diversity of student needs and the addition of accountability for performance standards, which has complicated the teaching process for novice teachers (Whisnant, Elliott and Pynchon 2005). A further set of factors can be added in the case of the Omani context, which is that the curricula have been changed completely, that a continuous evaluation system has been introduced and that novice teachers have been required to teach subjects which they have not been trained to teach.

Teachers' professional development programmes are no longer limited to enhancing what is going on in the classroom, but are increasingly being expanded to include activities outside of class and school. For example, results of some recent studies (Korhonen and Lavonen 2014; Niemi 2015) indicate that novice teachers need support in working with other members of the school community and working outside the classroom, as they are influenced by society and stakeholders like other partners (Niemi 2014). In addition, changes in society and the ways in which knowledge and learning are understood have created an urgent need for new educational goals (Ananiadou and Claro 2009; Harju and Niemi 2016). Therefore, a trend has emerged of supporting and facilitating students through active education instead of simply transferring information to them, which has led to some educational systems trying to integrate the so-called skills of the twenty-first century into their curricula, with the aim of preparing future students with the necessary skills in the field of information and communication technology and cultural awareness; in other words, the skills associated with the so-called fourth industrial revolution (Adamson and Darling-Hammond 2015; Binkley et al. 2012). This undoubtedly requires teachers, including novices, to master these skills and integrate them into the teaching process (Saavedra and Opfer 2012).

A large number of studies in Western contexts have addressed the professional development of novice teachers and their perceptions of the support they should receive (Morgan and Kitching 2007). One of these is a large-scale longitudinal study investigating the experiences of novice teachers in England, which confirmed that psychological support is one of the most prominent factors shaping their professional experience (Hobson 2009). A Scottish study has also found that the quality of novice teachers' performance is achieved through safe and

continuous PD (Fenwick and Weir 2010). More recently, Harju and Niemi (2016) conducted a study that focused on the professional education needs of novice teachers in the early years in four countries: Finland, the United Kingdom (England), Portugal and Belgium (Flanders). This comparative study produced many informative results, revealing for example that novice teachers in these countries needed more support in terms of student support holistically. In addition, its results indicate that novice teachers in Finland and Belgium needed more support to work in new educational environments, due to the increasing rate of digitalization. Finally, the study found that teachers in England and Portugal needed more support in conducting research activities in their work.

As for NSTs, a meta-analysis of 59 studies of science teachers during the first five years of their teaching practice found that their primary interests focused on six areas: understanding the content and specializations of science, using educational strategies, the skills needed to deal with students, managing classrooms, understanding the learning environment and finally, professionalism within the walls of the school (Davis, Petish and Smithey 2006).

Meanwhile, research conducted in China has concluded that the most appropriate form of development for novice teachers is the formation of their professional identity and practice of social culture, with the aim of helping them to integrate “because this, in the end, affects students’ learning methods and their results” (Zhao, Coombs and Zhou 2010, p.391). In another study in Hong Kong, Ng (2010) found that PDPs associated with school activities had the greatest impact in promoting continuing education for novice teachers.

A number of other researchers have identified principles for the effective PD of novice teachers. Garet, Porter, Desimone, Birman and Yoon (2001) conducted a study of 1027 teachers in mathematics and science subjects, which concluded that there are three positive features of an effective professional development programme that can enhance teacher learning and improve teacher practice: It should focus on knowing the content of the topic, active learning opportunities and aligning with other teachers. These results are consistent with those of a later one by Penuel, Fishman, Yamaguchi and Gallagher (2007), which used a sample of 454 science teachers and which provided strong evidence that a successful PDP must respond to the needs of teachers.

As for studies in the Omani context, the World Bank (2012) found that the Omani education system was severely hampered by a failure to train teachers in student-centred learning strategies. The World Bank study also reported that 65% of Omani teachers with less than 10 years of teaching experience had a poor knowledge of the curriculum and the use of tools and related technology. In addition, they have been found to lack the skills needed to choose appropriate teaching methods for student learning (MoE 2016). Having established the importance of professional development and the needs of the novice teacher, the next section examines the types of support that novice science teachers need.

3.7 Professional development activities for novice science teachers

The professional development of teachers takes place in both formal and informal settings. Formal environments include induction programmes, educational research groups and formal mentoring programmes (Timperley 2011), while informal learning interactions occur during peer teaching, peer mentoring and collaborative planning (Little 2012). In the following subsections, I will highlight the most prominent PD activities providing support for novice science teachers, which are PLCs, induction and mentoring.

3.7.1 Professional learning communities in schools

PLCs represent a method of acquiring and sharing experiences and skills among teachers. Over the past two decades, they have attracted the attention of educators interested in professional development policies and programmes for teachers. Despite the multiplicity of definitions of PLCs, many contributors to the literature describe them as groups of teachers who meet with each other to participate in regular sessions of inquiry-based learning with the aim of developing their collective and individual capacities in order to improve their students achievement (Stoll et al. 2006; Katz et al. 2009; Hairon et al. 2017). Vangrieken et al. (2017) see them as sustainable spaces of continuous professional development, while for Wenger (1998), they can be seen as a “special case of communities of practice”.

The literature indicates that there are five main characteristics of successful PLCs: collaboration, trust, focus, leadership support and long-term inquiry (Katz et al. 2009; Vescio et al. 2008). Collaboration contributes to collective shifts in practice and is important for teachers because they learn through it (Stoll et al.

2006). Horn et al. (2018) also assert that teachers who work together to achieve a specific goal are more successful than those who work alone. Trust generates fruitful learning relationships and is part of cooperation, as it requires teachers to challenge each other's practices and trust that they are "the ultimate beneficiaries of the PLC's work" (Schechter 2012). PLCs also need a clear and common focus among their members in order to benefit from the change (Katz et al. 2009). The literature stresses the importance of the leadership role in achieving strong PLCs, asserting that the support of principals, deputies, senior teachers and department heads is of great importance in providing resources and time to work (Katz et al. 2009; Stephan et al. 2012; Stoll et al. 2006). Finally, inquiries and ongoing discussions in various school settings create possibilities for meaningful learning among PLC members.

Schools are a PLC environment for teachers (Vescio, Ross, and Adams 2008). Fullan (2007) argues that vocational education in the context of schools is the only form of education that can change teachers' practices in the classroom. Others have asserted that schools have strong learning communities that may achieve higher levels of student achievement if directed in the right way (Bryk, Sebring, Allensworth, Luppescu, and Easton 2010; Horn and Kane 2015). The literature review indicates that high-performing schools feature multiple forms of teacher collaboration such as professional learning communities (Fulton and Britton 2011; Lomos, Hofman, and Bosker 2011b; Scheerens 2014).

Momanyi (2016) notes that the ability of people in leadership positions in a school is the most important factor in the success of the school's role in shaping a motivated, collaborative and effective learning community. Consequently, the school is a PLC that represents an umbrella for the direct or indirect learning of novice science teachers.

The school learning community includes a number of resources such as the school leadership, subject leaders and colleagues, who are a strong source of professional learning for NSTs. In addition, they provide mentoring services within the school. The following subsections discuss each of these sources in detail.

3.7.1.1 Support from the school leadership

Many studies indicate that school leaders can create an educational environment in schools which helps novice teachers to define their needs by promoting

experimentation and allocating resources to support their learning processes and encouraging the implementation of new educational situations, in addition to providing appropriate learning conditions in the school with the aim of creating a learning culture (Thoonen, Sleegers, Oort, Peetsma, and Geijsel 2011; Postholm 2018; Vanblaere and Devos 2016). Ball et al. (2011) also describe school leaders as agents of change within their schools, as they integrate their entrepreneurial skills to challenge assumptions about policies, in order to provide vocational learning opportunities to others. According to Kyriacou and Kunc (2007), one of the main factors affecting the retention and commitment of novice teachers is the significant support they receive, especially from school leaders and mentors. The provision of adequate support by school leaders is essential to create a healthy atmosphere and collaborative school culture (Bickmore and Bickmore 2010). The importance of a supportive school leadership was also highlighted by a study that investigated the main factors affecting the satisfaction and retention of first-year teachers in the United States of America, which found that the variables associated with the work environment were more significant than demographic variables in determining job satisfaction (Stockard and Lehman 2004). The results of a study by Jackson (2008, p.112) also confirmed that the school leader plays five main roles in helping to retain teachers: “(a) caring listener, (b) supportive advocate, (c) respectful colleague, (d) open-minded team player, and (e) enthusiastic facilitator”.

In a recent study, Sullivan and Morrison (2014) found that school leaders can empower novice teachers at the beginning of their careers. They argue that school leaders have great strength in enacting some policies through which they can provide continuous and appropriate learning opportunities to support novice teachers. The same study concludes that creative school leaders go beyond their mission of interpreting and translating policy to support novice teachers and convert them from policy recipients to part of the policymaking process. A later quantitative study conducted in ten Hong Kong elementary schools found that school leadership is necessary for teachers to learn and to pursue their professional development, as successful school leaders consistently encouraged teachers, especially novices, to adopt self-improvement and teamwork learning, in addition to providing training and development for all employees (Pang, Wang and Leung 2016). Sunde and Ulvik (2014) examined the needs of novice teachers

from the perspective of school leaders. Participating school leaders pointed out that new teachers need more support in information and practical solutions such as homework, rules and routines in school. Similarly, a survey of 234 teachers in six middle schools in Portugal found that teachers were highly interested in PD activities when they received encouragement and reinforcement from their school leaders (Sullivan and Morrison 2014).

In a survey of 1259 teachers from 41 schools in China, Liu, Hallinger and Feng (2016) found a positive relationship between leaderships focused on learning and the PD of the teachers, with teacher confidence being considered an important mediator in this relationship. A similar study in Thailand of 1011 teachers and 60 principals concluded that the leaders had an impact in driving the PD of their teachers and that trust acted as a mediating factor (Piyaman, Hallinger and Viseshsiri 2017).

A qualitative study in five Irish schools found that novice teachers needed the provision of continuous support via a bottom-up approach to planning professional development programmes, where school principals trusted teachers, so that teachers had time to plan and worked together to implement PDPs. The principals of these schools were described as brave and ready to take risks in an education system that is centralized and holds them accountable for performance (King and Stevenson 2017).

On the other hand, Flores (2001, p.139) describes the first experience of teaching as “surprising, stressful, and tiring.” The novice teachers involved in the study criticized school and leadership policy, stating that they were not encouraged to develop professionally and that they considered the school leadership to be negative and inactive. In a study in Cyprus conducted by Menon (2012), 14 of 25 novice teachers asserted that the difficulties they faced as new school arrivals could have been avoided or mitigated if the school leaders had been more active in supporting novice teachers.

3.7.1.2 Support from senior teachers

For professional development programmes to achieve their goal of supporting novice science teachers, efforts to do so should be integrated within the school. One of the most important sources of support in a school is the senior teacher, otherwise referred to as subject leader, middle leader or head of department.

The literature indicates that the role of senior teacher, responsible for a group of teachers in the same subject area in a school, has a long history (Bell and Ritchie 1999; Hammersley-Fletcher 2002). The mission of the senior teacher lies in planning school assignments related to the subject and creating opportunities for teachers' professional development, thus improving performance and student outcomes in the subject (Bolam and Turner 2003; Fitzgerald and Gunter 2006; 2007; Ribbins 2007; Thorpe and Tran 2015). The senior teacher is expected to be the "expert teacher" (Adey 2000) and the "pioneering professional" (Gunter 2005) in the subject. However, the duties of the subject leader involve more than technical management of the curriculum subject, including improving quality in practice throughout the department (Hopkins and James 2003). The senior teacher must therefore be able to create a professional dialogue and encourage an educational partnership among teachers of the subject on one hand and between them and teachers of other subjects in the school on the other, with the aim of facilitating critical thinking regarding the teaching process (Busher et al. 2000).

In Western literature, senior teachers are increasingly treated as subject leaders or middle leaders and seen as an intermediate group between senior school management and those who teach in the classroom, which gives them strength in influencing both groups in school (Fleming and Amesbury 2001). This intermediate role carries a heavy burden in terms of the time available to carry out the required tasks, teaching and the complicated relationships among the people who lead them (Adey 2000; Hammersley-Fletcher 2002). In the Middle East, novice teachers face tension in seeking to direct teamwork that focuses on a small team within the larger school team, in addition to monitoring standards and accountability (Bennett, Woods, Wise and Newton 2007).

Gold (1996) emphasizes the need for the senior teacher to provide support of two kinds to novice teachers, related to aspects of the teaching process and to feelings and relationships. Therefore, senior teachers should work on the culture of the subject team, including on emotional aspects and relationships, which requires particular skills and emotional intelligence, going well beyond familiarity with curricula and teaching methods (Tam 2010; Lam and Yan 2011). Thus, the expectations of novice teachers focus on the fact that the senior teacher plays an essential role in securing the success of their professional development, their

career progress and stability in the teaching process (Morgan and O'Leary 2004; Hobson 2009; Fenwick and Weir 2010).

A Vietnamese study of the role of the senior teacher in supporting novice teachers concluded that there should be multiple support and guidance points for the novice within the subject team, but that these tasks are not the sole responsibility of the senior teacher (Thorpe and Tran 2015), a finding consistent with that of another study, that the role of supporting and motivating novice teachers cannot be left to the subject leaders alone (Hamano 2008). In the Omani context, despite the presence of the position of the senior teacher as a resident supervisor in each school since the development of basic education began in 1998, official documents do not stipulate a specific role for senior teachers in supporting novices (MoE 2018a).

It is important to bear in mind that senior teachers themselves, as leaders within their schools, need support and development opportunities in learning how to deal with novice teachers, similar conclusions having been drawn in many contexts, including England (Hammersley-Fletcher 2002), Wales (Turner 2006), New Zealand (Fitzgerald and Gunter 2006), Portugal (de Lima 2008) and China (Mercer and Ri 2006; Wong, Wong and Peng 2010).

3.7.1.3 Support from colleagues

Colleagues play an important role in supporting novice teachers in their early years, including by acting as mentors at the beginning of their careers. Studies of the difficulties faced by novice teachers indicate that several strategies can be adopted to facilitate their transition from preservice training to professional practice and that among these, the mentoring of novices by more experienced colleagues is a very important source of support, facilitating their entry into the profession (Kunc and Kyriacou 2007; Menon 2012). In particular, supportive mentoring of novice teachers by colleagues is essential to creating a collaborative school climate (Bickmore and Bickmore 2010).

Research findings confirm that colleagues' support (Klusmann et al. 2008; Roeser et al. 2013) and collaboration among teachers in general (Lossen et al. 2013) constitute resources for novice teachers (Menon 2012). Colleagues' support as a social resource is also expected to reduce fatigue in the early years of a teaching career (Fernet et al. 2012; Smith and Gillespie 2007). The results of other studies indicate an inverse relationship between teacher stress and peer

support (Collie et al. 2012; Egodawatte et al. 2011; Lossen et al. 2013). Teacher fatigue decreases if novice teachers feel supported by their peers (Smith and Gillespie 2007).

One of the most important mechanisms for colleagues to support novice teachers is collaborative and repeated lesson planning, where teachers interact constructively with one another as they work (Johnson and Johnson 2005). Another important element in guiding a novice teacher is the observation of lessons by colleagues; a study carried out in Shanghai schools indicates that this mechanism helped novice teachers to gain great experience in preparing lessons through the reviews, assessments and discussions that they obtained from experienced teachers (Wu, Zhang and Tian 2009).

Similar results are reported in Western contexts; in a report on the Initial Teacher Training Review in England, for example, Carter (2015) emphasizes the importance of the role of colleagues as mentors for novice teachers and concludes that such mentors should be chosen from among those excellent teachers who are able to explain and clarify the best practice. Collaboration with colleagues is also common among teachers in Germany (e.g. Steinert et al. 2006).

Conversely, the challenges faced by novice teachers will increase in the absence of a collaborative school culture and of effective support from colleagues (Ulvik et al. 2009). Numerous studies highlight the challenges novice teachers face due to a lack of peer support. Worthy (2005) reports the case of a teacher who, in the absence of a targeted colleague, had to become more active in the search for a support system outside the school. Wynn et al. (2007) found that a novice teacher's decision to remain in his job had a strong correlation with the school climate. In Canada, Fantilli and McDougall (2009) found that novices faced many major challenges in their first year, such as dealing with different groups of students, effective communication with parents, scheduling, planning and time management. Participants in their study confirmed that these challenges were linked to the lack of help from colleagues and the lack of a qualified teacher to provide appropriate guidance.

3.7.2 Mentoring programmes

The concepts of induction and mentoring are not synonymous, but there is the potential for confusion in their use when discussing the topic of professional development for novice teachers. Wong (2004a, 42) defines induction and explains how mentoring differs from it, as follows:

> *Induction is a process—a comprehensive, coherent, and sustained professional development process—that is organized by a school district to train, support, and retain new teachers and seamlessly progress them into a lifelong learning programme. Mentoring is an action [by] a single person, whose basic function is to help a new teacher.*

It is clear from this definition that mentoring is not induction, but is part of the induction process. The role of the mentor is to help the novice teacher to survive in the profession and overcome the associated challenges, while induction is a more comprehensive concept subsuming mentoring and comprising several other activities that are presented to the novice teacher as continuing professional education with the aim of achieving greater effectiveness in the profession (Breaux and Wong 2003).

Although mentoring is the most important component of the induction programme, it must be part of a larger process that is consistent with the vision, mission and structure of the education system in the country concerned in order to be effective, and mentoring should be used with other components of the induction process to maximize the effectiveness of the novice teacher (Wong 2002b).

Wong (2004) argues that no two induction programmes are identical, because each meets the individual needs and academic standards of a particular context. However, there are seven elements that can be seen to underlie the success of any introductory programme for novice teachers:

- Providing five introductory training days for all novice teachers before starting school.
- Implementing a professional development programme through systematic training for novice teachers over a period of three years.
- Providing a research group consisting of novice and experienced teachers that enables novices to communicate and to build support, commitment and leadership in the learning community.
- Providing administrative support.

- Having an orientation process as an essential component of the induction programme.
- Providing modelling for effective teaching structures during mentoring.
- Providing opportunities for novice teachers to visit classrooms to learn about the correct teaching process.

It is clear from the above that there is a strong correlation between induction and mentoring, and that the mentoring process within the school is important in providing immediate and systematic support to the novice teacher.

Mentoring is one of the tools of induction or initial teacher education. The literature covers a wide range of aspects of the mentoring of novice teachers, but there is consensus on the value of mentoring and its positive impact on novice teachers (Young et al. 2005; Hawkey 1997; Smith and Erickson 2005; Hawkey 1997). Mentoring has long been presented as a practical way to support novice teachers (Beutel, Crosswell, Willis, Spooner-Lane, Curtis and Churchward 2017), with the aim of helping them to become part of a school career community "in which members participate as equals in professional dialogue aimed at their individual and collective self-development" (Kemmis et al. 2014, p.157). More broadly, school orientation programmes contribute to helping the novice teacher overcome many of the challenges typically encountered in the first years of working in the teaching profession (Aspfors and Bondas 2013; European Commission 2010; Fletcher and Mullen 2012).

There are many definitions and descriptions of the mentoring process as applied to novice teachers, among which Anderson and Shannon (1988, p.40) state that mentoring is

> *a nurturing process in which a more skilled or more experienced person, serving as a role model, teaches, sponsors, encourages, counsels and befriends a less skilled or less experienced person for the purpose of promoting the latter's professional and/or personal development. Mentoring functions are carried out within the context of an ongoing, caring relationship between the mentor and the protégé.*

From the above definition, several matters relating to the issue of guidance can be inferred, notably that the ideal setting for mentoring is where the novice teacher feels welcome, accepted and included (Maynard 2000), that mentoring is positive, non-threatening, readily available and readily available (Bullough and Draper 2004) and that there should be regular orientation meetings and a

timetable for commenting, discussion and feedback on the teaching practice for novice teachers (Hobson 2002).

The literature lists a number of important benefits of mentoring for novice teachers, including the provision of opportunities to learn many things about teaching, thus boosting their job satisfaction and self-efficacy (Smith and Ingersoll 2004). Mentoring has also been shown to have a positive impact on teacher retention and proficiency (Buchanan et al. 2013; Aspfors and Fransson 2015; Spooner-Lane 2017).

Maynard and Furlong (1995) suggest changing the role of the mentor according to the needs of novice teachers in the various stages of development. Thus, the mentor would act initially as a collaborative teacher, that is, a model for the novice teacher to follow in his practice. When the novice has completed the first stage and appears ready to take more responsibility, the mentor begins to change his role to that of a coach, so that he monitors the novice teacher and provides feedback to him. Finally, when the novice has acquired the basic skills as required, the mentor can act as a 'co-enquirer' who enhances the process of critical reflection on teaching and learning which the novice should engage in.

Despite the importance and benefits of formal mentoring, there is some evidence in the literature that it is not practised in some educational contexts. In Chile, for example, novice teachers reported that they were never mentored or provided with feedback in school. They indicated that if they were supported and received mentoring opportunities they would be more professional as teachers (Avalos and Aylwin 2007). The novice teachers participating in a study in Norway also expressed the need for mentoring in teaching their subjects regarding human relations and classroom management (Ulvik et al. 2009). The authors conclude that mentoring should be part of the school system and should continue throughout the whole of the first year, rather than being available only at the beginning.

In the context of the present study, formal mentoring still does not take place as required in Omani schools, despite its demonstrable benefits and Omani novice teachers' need for mentoring services, especially those novice teachers who are assigned to remote and isolated areas where senior teachers are often not available to provide support, where supervisory services, including visits by supervisors, are infrequent, where internet connectivity is limited and where

access is compromised by the distances of hundreds of kilometres between these schools and the governorate training centres. All of these and other challenges should be a priority for policymakers in providing mentoring and mentors as an option to support this group of teachers in schools. It is important to highlight this issue when discussing policy on the PD of novice science teachers.

3.7.3 Support through the teacher agency model

Teacher success is a journey of actions, not just an event, meeting, or training programme presented here or there (Fullan 2001). For teachers to be effective, PDPs must aim in the first place to develop their skills at every stage of their careers (Kardos 2003). Professional learning activities should also be an integral part of their daily working environment, encouraging their involvement in cooperative groups in order to acquire professional knowledge in a manner that is reflected in the improvement of the school (Billett 2008; Evans 2017). This approach relies on teacher agency, a concept which refers to the teacher's ability to plan and enact change in the orientation and organization of schoolwork, in addition to the impact on the school environment (Wilson and Deaney 2010). Vähäsantanen (2015) describes the agency of teachers as an activity through which to encourage teachers to choose alternatives and make decisions that affect their school roles.

Imants and Van der Wal (2020) list three factors that have led to an increased interest in the role of teacher agency in teachers' professional development and school reform: 1) awareness of the effective and practical role of teachers as agents of change in the improvement of schools; 2) the relationship of agency with teachers' professional identity and their ability to effect change in schools; 3) close attention to the role of teachers' working environment in professional development and school reform.

Two approaches to teacher agency can be discerned in the literature. The first takes agency to be an individual feature or "capacity" (Bandura 2001, p.1) and the second links it directly to the working environment or "social context" (Johnson 2006). The capacity approach involves assessing teachers' ability to make decisions on their own or in groups in specific situations, where they take initiatives and act proactively with a view to achieving a specific goal within the context of a specific interaction. This ability leads teachers to display different characteristics, not necessarily responding positively to actual or planned reforms

(e.g. professional development programmes), but perhaps rejecting them and continuing or negotiating existing activities (Vähäsantanen 2015). As to the social context approach, this involves appreciating that teachers are socially active and that their agency plays a key role in multiple choices when pursuing education and in their compliance with or resistance to reforms in light of their personal goals, values and beliefs (Norton 1997).

According to Imants and Van der Wal (2020), there are five characteristics of teacher agency in professional development, as follows:

1) The role of individuals. A direct consequence of the agency approach is that teachers, school leaders, students and parents are treated as active contributors to PD and school reform, not simply as passive recipients.

2) The dynamic relationship with continuous interaction in teacher development efforts, which Lee and Roth (2007, p.93) refer to by noting that “learning individuals make learning organizations what they are while the latter simultaneously provide necessary affordances or action possibilities for its members to develop”. Thus, the existing relationship is one of continuous interaction and not a linear or one-sided relationship.

3) Professional development and school reform are fundamentally affected by the context, because the context of educational work is complex and both PD and reform operate at several levels. Therefore, any examination of teacher agency should focus on the direct work environment for teachers and take into account the indirect impact on that environment of national policy, public school culture and administrative decision-making.

4) The content of professional development is treated as a variable, because it is subject to teachers’ enactment. In the event that the content is redefined by teachers, it is variable because teachers interact with it as part of their enactment in their working environment. If the content is excluded and rejected, it is treated as an external feature.

5) The results or events are part of a continuing cycle. Given that the teacher agency model is dynamic, the results of professional development or reform are events in a continuous cycle and not a final outcome. Consequently, they are treated as inputs to an ongoing process by which teachers develop PD content.

3.7.4 Teacher agency and professional learning communities

Eteläpelto et al. (2013) assert that agency in schools can be practiced by teachers as individuals or communities; more specifically, that “professional agency is practiced when teachers and/or communities in schools influence, make choices, and take stances in ways that affect their work and their professional identity” (p.61). In the case of professional learning communities, Riveros et al. (2012) argue that these have the potential to make a difference in school reform if they prioritize teacher agency and teacher learning. This is consistent with the assertion of Putnam and Borko (2000) that peer collaboration in schools is a way for teachers to acquire knowledge of their profession and practise their agency in the school environment, which will be reflected positively in students’ educational success. The basic premise in PLCs is that student achievement will improve as a result of peer-to-peer cooperation among teachers and the ability of such communities to transform teaching practices in pursuit of this goal. The Alberta Commission on Learning (2003 states that the main aim of PLCs is “the continuous improvement of student’s results. Teachers and administrators continuously seek and share information and act on what they have learned. And all of their efforts are concentrated on improving their practice so that students can achieve the best possible results” (p.64). The key point here is that teachers’ practice is something that must be improved by developing a fully collaborative model, because teacher practice is the most important component of the model of PLCs (Riveros et al. 2012).

Stoll et al. (2006) pose an important question which arises as a result of the failure of previous peer-collaboration models to improve school outcomes: How can the idea of professional learning communities be presented in a new way that overcomes the difficulties of collaborative models? Anderson and Riedel (2003) emphasize the urgent need to establish a strong relationship within the school community, based on mutual support among professionals and taking into account that the ability of teachers to establish supportive and meaningful relationships with one another is an essential component of their professional practice (Huffman 2003; Louis and Gordon 2006).

In order to implement the characteristics of teacher agency in PLCs in schools, Tarnoczi (2006) suggests altering the way teachers understand their professional practice by changing their attitudes toward organizational goals. Tarnoczi

supports this suggestion by arguing that there is a contradiction between the democratic participation available to teachers in building a common understanding of school goals and the fact that these goals are predetermined by policymakers. The call to build mutual understanding and school values thus has nothing to do with promoting teacher participation in setting school goals, because it only indicates ways to require teachers to comply in order to achieve these goals. However, the contradiction to which Tarnoczi refers disappears as soon as teachers are subjects of change (Riveros 2012), which is the fourth feature of teacher agency referred to above.

Howe (2009b) maintains that organizational change in PLCs must go beyond the idea of a commitment to changing topics, taking account of key variables such as education policy, the political climate and stakeholders' perceptions of their social reality and viewing schools as arenas for educational policymaking and reform. In addition, Weick (2003) defines legislation as the process of transforming the environment actively through work. From this perspective, it can be said that legislation is the means that teachers use to understand the state of their school environment. Therefore, Weick (2003) suggests that teachers enact an understanding of professional knowledge in their practices. The enactment of policies means the way people in schools understand the mission of politics and this understanding of policy messages thus plays a critical role in implementation, because the understanding is illustrated by practice. It follows that professional learning communities become a means of improving the school and not an end in itself; and from this, the features of so-called teacher agency emerge.

3.7.5 Teacher agency as a counterargument to the deficit model for novice teachers

The deficit model is based on the assumption that early-career teachers lack many of the skills and knowledge necessary to carry out their tasks (Feiman-Nemser et al. 2000). Therefore, there is a basic assumption that junior teachers at the beginning of their careers lack competence and need to be 'fixed' in order to become good teachers (Day and Sachs 2004). This category of teachers faces great pressure from governments that are working to shape their work and focus on their professional development (Flores 2012). According to Ball et al. (2012), "teachers at early stages in their careers are often perceived as receivers of policy, that is policy is done to them".

Among the factors that play an important role in a teacher's professional development are the teacher's identity and beliefs, the school leadership, its culture, the resources in it and external factors, as these interact with their different levels to form the teacher's response to the policy, which is usually acceptance, resistance or negotiation, the features of teacher agency (Berland et al. 2012; Ryder and Banner 2013).

In the context of teachers' PD, Vähäsantanen (2015) asserts that agency is an exercise in which (novice) teachers are trained to make decisions and choose among alternatives that affect the responsibilities and roles assigned to them; this exercise generates the teacher's ability to work in ways that are not necessarily consistent with the required reforms, but involve continuing with the current practice while negotiating between what he believes and what the intended reform imposes.

A study by Lasky (2005) found that teachers felt that their professional beliefs (including their identity and context) were threatened by policies imposed from outside (based on the deficit model) and that they accordingly mobilized their ability to adjust the policy imposed to meet their professional beliefs. The author notes that the teachers' professional beliefs and identity were the main drivers of change in practice but in a way that conflicted with the imposed policy. Accordingly, novice teachers are not necessarily incapable of carrying out their tasks and responsibilities; they have their experiences, biographies and future goals in teaching, in the light of which they make decisions about practices in relation to the imposed policy (for example, professional development programmes). This has significant policy implications in countering a deficit discourse of novice teacher training and development. There is a need to recognise the agency of novice teachers, to hear their voice and to take their views and perceived needs into account, to ensure that the quality of their training provision is fit for purpose. This also has clear research implications in considering the perspectives of all key stakeholders in the training of novice science teachers, including not only key policy makers and training providers but the novice science teachers themselves.

3.8 Challenges facing novice teachers in the early years of teaching

In the previous sections, I have discussed professional development programmes of various kinds and considered how these can provide support and assistance to teachers in general and to NSTs in particular. In this section, I will address two important aspects of policy on the PD of novice science teachers: on one hand, the challenges that this category of teachers faces in the early years of their careers and on the other hand, the extent to which multi-level PDPs can mitigate these challenges.

I would argue that the challenges faced by novice teachers in different contexts are caused by two main factors: the gap between expectations and experience, and the fact that novice teachers are expected to fulfil the same responsibilities as their more experienced colleagues. The first concern is that there is a mismatch between the new teacher's idealistic view of the teaching process and the reality of the classroom, explained by the fact that the novice teacher derives idealized beliefs about teaching from the theories of learning and teaching that he or she has studied or through experience gained during the pre-university stage. Farrell (2012) notes that novice teachers strive to fulfil their primary mission of applying all the knowledge they learned when they enter a real-life classroom for the first time. The same concern with the difficulty of applying the novice teacher to the theories of teaching in practice has been found in several studies, such as those of Yunus et al. (2010) and Senom et al. (2013). In this regard, Richard (1998) claims that novice teachers cannot directly apply the knowledge obtained from preparation courses to their practice, because they need to rebuild knowledge by participating in different types of activities and in specific social contexts.

The second concern is that the novice teacher is treated in a similar way to more experienced teachers, in terms of responsibilities and teaching burden, causing conflicts to arise between the novice teacher on one hand and students, school administration, colleagues and parents on the other. Studies by Senom et al. (2013), Fantilli and McDougall (2009) and Farrell (2003) show that the first years of teaching are the most difficult period of a teacher's professional life, because the novice is trying to deal with many issues and challenges that he has not previously dealt with. Ezer and Sabar (1992) describe novice teachers as being considered strangers because they act according to a set of standards absorbed

during their time at a teacher preparation institution, where there was a clear set of rules of conduct that they try to maintain when they enter a new environment, the school, with its own set of standards, different from those with which the novices are familiar. They must now adapt to membership of a group of existing teachers which is often coherent in its application of particular rules and customs. Experienced teachers will seek to impose these values on the newcomer and from this interaction, conflict and challenges will tend to arise.

Based on these two concerns, the novice science teacher begins to experience such challenges to varying degrees, depending on the wider social context, the immediate working environment and the level of support provided within that environment or the school system to overcome them. The two subsections below examine the challenges facing novice teachers in general and NSTs in particular.

Meanwhile, numerous studies have indicated the importance of the early years of the teaching profession for the development of the novice teacher (David 2000; Flores 2004; Ganser 2002; Worthy 2005). Dias-Lacy and Guirguis (2017) claim that the first year of a teaching career determines the longevity of the teacher in the profession, while Peters and Le Cornu (2006) report that among teachers in the Western world, a third of resignations and cases of overwork occur in the early years. This is due to a general lack of support and of organized response to the actual needs of novice teachers (March 2012). Other researchers have also reported that novice teachers feel that they are not ready to meet students' academic, cultural and personal needs and that they urgently need to seek help in managing classrooms, accommodating school procedures, understanding learning and communicating effectively with parents (Guat 2008). Stanulis, Fallona and Pearson (2002) predict that the failure to meet these needs will lead to a high rate of teacher attrition.

The effect of the transition from training institution to classrooms has been described as a "reality shock" (Farrell 2008) or "application shock", which occurs when the novice teacher is confronted with the unexpected responsibilities of school life (Kelchtermans and Ballet 2002). For Beauchamp and Thomas (2011), this period, specifically the first few months of a novice's appointment to the profession, is a boundary space between teacher education and the practice of teaching duties. Novice teachers participating in a study by Sabar (2004) reported having experienced prevailing feelings of failure, despair and fear at the

beginning of their first year of teaching. On the other hand, Veenman (1984) refuses to use the term ‘reality shock’, explaining that it is often used inappropriately, in that it would normally denote a shock lasting for only a very short period, whereas the reality of the challenges facing the novice teacher is completely different.

3.8.1 Challenges facing novice teachers

Numerous studies have been conducted in many different contexts to investigate the challenges facing novice teachers (Alhamad 2018; Chubbuk et al. 2001; Dias-Lacy 2017; Fantilli and McDougall 2009; Gourneau 2014; Richards and Pennington 1998; Sabar 2004; Scherff 2008; Veenman 1984). Together, these have shed light on the nature of the earliest stage of a teaching career and serve to provide important information which can be used to improve the professional development programmes offered to novice teachers. In the earliest of the studies listed above, Veenman (1984) reviewed the published research on twenty-four of the challenges most commonly ascribed to novice teachers and found that classroom discipline was reportedly the most challenging of the obstacles faced by novice teachers at the beginning of their careers.

Ganser (1999) revisited Veenman’s results and found that more than fifteen years after the original study, the challenges remained largely the same. Another fifteen years later, Gourneau (2014) conducted a study of the challenges facing novice teachers and identified five main challenges: classroom management, working with parents and families, differentiating instruction for students, dealing with students who exhibited difficult behaviour and assessment of student learning. Although thirty years passed between Veenman’s review and Gourneau’s study, the latter found that some challenges remained constant across generations and contexts. For example, classroom management—defined by Jackson and Joyce (2003, p.3) as “all of the things that a teacher does to organize students, space, time and materials so that instruction in content and student learning can take place”—continued to feature among the challenges facing novices in the early years of their teaching life and many questions on this topic turning in their minds remained unanswered. Examples of such questions given by Gourneau (2014) are these: How can a novice teacher manage the class to provide an ideal learning environment? How can appropriate control be exercised and maintained in the classroom?

Another study conducted by Dias-Lacy and Guirguis (2017) classified nine challenges facing the novice teacher in the early years of teaching according to their severity: work overload, curriculum challenges, lack of support from the administration, discipline challenges, lack of support from other teachers, work demands and family demands, classroom time management, wanting to meet self-expectations. In a review of initial teacher training programmes in England and Wales, Carter (2015) found that the greatest challenge affecting PDPs for novice teachers was subject knowledge development.

In the Omani context, a study by the World Bank (2012) identified a number of challenges that novice teachers in Oman faced at the beginning of their teaching careers: accommodating individual student differences, classroom management, student assessment and student motivation. The following year, Shabibi (2013) found similar challenges among novice English teachers, namely the pressure of workload, classroom management, time management and assessment of students' performance.

3.8.2 Challenges faced by NSTs

Davis, Petish and Smithey (2006) examine the challenges faced by NSTs in their early years in several PD journals for teachers and categorize them under five main themes: 1) challenges related to the science curricula, 2) dealing with students, 3) instructions for teaching, 4) the teaching environment and 5) understanding professionalism.

Alsharari (2016) identifies two types of challenges for novice teachers in Saudi Arabia: academic and behavioural. Academic challenges include poor preparation of NSTs, lack of appropriate school equipment and lack of support from the ministry and schools, while behavioural challenges include student absenteeism from school and low student interest in science. Vasquez (2008) emphasizes that novice science teachers need to have sufficient knowledge of the content of science to be effective and overcome the challenges they face in the subject. In addition, NSTs face the challenge of an incapacity to participate in teaching standards-based science subjects (Smith and Gess-Newsome 2004), as well as a lack of teaching aids and of the materials and equipment needed to support science teaching practice in school laboratories (Appleton and Kindt 2002).

My experience of recruiting novice teachers for the Omani MoE suggests that the majority of NSTs are enthusiastic and have a desire to be good teachers, but that after a few months, they lose confidence in their skills as they face new situations that pose challenges for them.

3.9 Studies of professional development for teachers in Oman

Official Omani policy on the PD of novice teachers in general and NSTs in particular has not undergone systematic and extensive evaluation. Studies of the professional development of teachers in Oman seem to have begun in 1998, after the introduction of the basic education system. These have helped to identify possible ways to investigate the professional development of NSTs and have provided valuable information about the extant literature on teacher training in Oman. However, most of these studies have specifically examined professional development issues affecting English language teachers in the Sultanate. Table 3.1 summarizes the aims, methods and results of previous studies on PD in Oman.

Table 3.1 Studies on professional development in Oman

Author	Title	Aims	Sample	Instruments	Findings
Al-Balushi and Al-Abdali 2015	*Using a Moodle-Based PD Program to Train Science Teachers to Teach for Creativity and its Effectiveness on their Teaching Practices*	Training science teachers to teach creativity and to examine their ability to do so.	Nineteen science teachers in secondary schools.	1) Training implemented using a Moodle platform whose main elements were cognitive presence, social presence and teaching presence. 2) Experimental design. 3) Observing and assessing participants' practices by specific form.	1) The two most successful elements of the programme are cognitive presence and teaching presence. 2) The participants' interaction is weak and their discussion is limited over the Internet. 3) The practices of science teachers on creativity are improving.
Al-Blooshi 2009	*Beginning teachers' perceptions of their first year's teaching experience*	Examination of beginning teachers' perspectives on support during the first year.	Sixty-five Omani beginning English teachers appointed in the 2006–2007 academic year: 55 graduates of Ajman University and 9 from various other universities in Oman.	Questionnaires	1) Beginning teachers need support. 2) Advice and encouragement is required to share experiences of daily teaching. 3) The study stressed the importance of self-development of teachers through PD.

Author	Title	Aims	Sample	Instruments	Findings
Al-Lamki 2009	*The Beliefs and Practices Related to Continuous PD of Teachers of English in Oman*	To investigate the continuous PD of English teachers in Oman in the context of educational reform.	The data were collected in two phases: 324 English teachers, then 12 English teachers and 7 ministry officials from English departments	Questionnaire and semi-structured interviews	1) There is a degree of ambiguity in the aims and implementation of the continuous PDP among participants. 2) Teachers still believe that the PD of teachers is achieved only through formal training. 3) Teachers wanted to participate in decision-making regarding PDPs, but their participation has been limited until now.
Al-Rasbiah 2007	*In-service Training Needs of EFL Teachers in Oman*	To identify the training needs of in-service English teachers.	A total of 338 teachers (males and females, Omanis and non-Omanis), 80 supervisors and 17 teacher trainers.	Questionnaires	1) English teachers' most important needs are in the area of teaching writing. 2) Omani diploma holders and new teachers expressed a great need for in-service training.
Al-Hinai 2007	*The interplay between culture, teacher professional and teachers' PD at times of change*	To investigate the general PD system in the MoE in Oman	English teachers	Interviews and document analysis	1) Omani teachers value in-service training for their PD. 2) Omani teachers do not have training alternatives in workplaces. 3) A new model should be applied to PD inside schools.
Al-Bahn 2006	*First-year Omani teachers of English: Expectations, development and support*	To examine expectations for support among English teachers in their first year of teaching.	Four first-year Omani English teachers.	Semi-structured interviews	1) Senior teachers contributed significantly to developing the skills and knowledge of new teachers.

Author	Title	Aims	Sample	Instruments	Findings
Al Yafaee 2004	*An Investigation into the Attitudes of Omani Teachers to INSET Courses*	To investigate the participation of teachers in decision-making regarding the in-service training programmes.	Fifty teachers, male and female, from different governorates in Oman.	Questionnaire with open-end questions	1) All participants emphasized the importance of involving teachers in suggesting training topics. 2) Teachers agreed that they lacked the ability to share their views on the aims and contents of training programmes.

Scrutiny of Table 3.1 reveals several limitations of Omani research into the PD of teachers which are of relevance to the current study, as well as to future research in this field. The following subsections examine these limitations in turn.

3.9.1 Policy on the professional development of NSTs in Oman

Policy plays an important role in determining the objectives of teacher training. However, the Omani studies listed in the table do not address government policy related to the PD of novice teachers. The current study seeks to address this research gap by analysing policies related to PD for NSTs in Oman in order to understand what they entail and how they were created.

3.9.2 The importance of professional development programmes

The studies listed in the table show that continuous PD is one of the ways that Omani teachers most wish to improve their teaching skills (Al-Hinai 2007; Al-Lamki 2009; Al-Balushi and Al-Abdali 2015; Al-Blooshi 2009). However, they also reveal that for the purposes of PDPs, all teachers in Oman, whether novice or experienced, are treated the same. These preliminary conclusions require further investigation into PD policies for Omani teachers of all categories, especially NSTs.

3.9.3 How professional development is delivered to teachers

The previous studies show that the PD of teachers in Oman is conducted in one particular way, namely through formal, face-to-face training, between a trainer and in-service teachers. A cascade organizational model is also used to train in-service teachers and to identify trainers in all governorates of the country. This method involves training teachers centrally, then instructing them to return to their governorates to replicate the training programmes with all teachers (Al-Rasbiah 2006; Al-Lamki 2009; Al-Balooshi 2007). These preliminary conclusions raise a number of questions about whether these strategies can address the challenges facing NSTs and about the effectiveness of the training.

3.9.4 Methodology

Most of the studies listed in Table 3.1 have used questionnaires to collect data, while some used semi-structured interviews. Most involved the participation of teachers from one or more governorates in Oman. However, none of them included teachers in remote governorates, which usually lack services. All of the studies targeted teachers in general, except one which targeted senior teachers.

None of them interviewed or surveyed policymakers, although one study did target supervisors and trainers (Al-Rasbiah 2007). This means that the present study will not obtain a full understanding of the PD of NSTs without taking these views into account.

This study targets all stakeholders—government officials at the MoE and in the governorates, supervisors, senior science teachers, trainers and NSTs in both urban and remote rural schools in a variety of governorates—in order to provide a clear and comprehensive picture of policies regarding PDPs for NSTs in Oman. It uses several instruments (document analysis, interviews and questionnaires) to obtain rich details on these issues. In particular, the participation of respondents and interviewees the six governorates will help to determine how PD policies affect NSTs in cities and remote areas.

3.10 Summary

The analysis of Locke and Golden-Biddle (1997) reveals that reviewing the literature on the topic of research is an essential component, helping researchers to formulate research questions by finding a deficiency or lacuna in it. Sandberg and Alvesson (2011) argue that discovering something neglected in the existing literature is among the most common methods of building research questions, whereby the researcher tries to identify a field or topic where no one has previously conducted research, referred to as ‘virgin territory’ or a blank on the knowledge map. They call this ‘neglect spotting’ and identify three types, namely the designation of a spot that has been ignored by previous researchers, where research has been incomplete or where experimental support is lacking.

The present study seeks to address some of the gaps in policy on the professional development of NSTs in Oman and similar contexts. Most of the literature reviewed in this chapter contributes to understanding a number of issues related to such policies in contexts different from that of Oman, due to the paucity of studies set in Oman that examine the issues affecting novice teachers in terms of building a policy on PDPs at the three levels and the challenges that stakeholders face when planning or implementing the policy, in addition to stakeholders’ expectations and experiences related to the professional development of NSTs. The review has thus served to identify a number of gaps

prompting the formulation of the research questions, as will be addressed in the next chapter.

Chapter 4

Research Methodology

4.1 Introduction

This chapter begins by restating and explaining the research questions, then describes the study sample and the types of data collected from each group. Next, the research methods, stages of research, data collection processes and data analysis are discussed, followed by comments on the quality of the research. After addressing some ethical considerations, outlining the conduct of a pilot study and the chapter concludes with a summary.

4.2 Aims and research questions

The aim of this research, as stated in Chapter One, was to evaluate the new policy of the Ministry of Education in Oman on the professional development of novice science teachers by eliciting the views of key stakeholders and investigating their practice of the policy. This broad aim was underpinned by three research questions, which are now restated and explicated in turn.

RQ1 Why did the MoE consider the creation of a new policy for the professional development of novice science teachers necessary, and with what specific objectives and anticipated outcomes?

To address this question, it was necessary to consider the content of the MoE's policy on the PD of NSTs, but its focus is on the Ministry's interest in this group of teachers and the internal and external factors that led it to adopt a new policy on their professional development. It was also necessary to consider the three levels (Ministry headquarters, governorate and school) at which PDPs for NSTs are delivered, according to policymakers, with particular attention given to the SIPTT as the source of the new policy.

It should be noted that the literature review contributed significantly to the development of this question in terms of understanding the essence of the policy (see Chapter 3, Section 3.2).The review also contributed to an understanding of the factors leading to the formation of educational policy in Western contexts and of the extent to which these factors were taken into account by the Omani

policymakers when developing their PD policy (see Section 3.3), in addition to deepening my understanding of the role of professional development and its effectiveness in educational policy (see Section 3.5).

The consistency between MoE policy on PD and its application at governorate level is addressed by the second research question:

RQ2 What are the key stakeholders' expectations of the current professional development provision for novice science teachers and how do these compare with the MoE's policy objectives?

This question can be seen to refer to several interrelated objects of enquiry: stakeholders' expectations of the levels of professional development delivered to NSTs and their relation to the achievement of policy objectives; key PD topics proposed for inclusion in the NSTs' induction programme and the methods of implementation; and the expectations of NSTs themselves as to the support associated with their PD provision.

Various aspects of the new policy were explored in order to gain a deep insight into stakeholders' expectations. These included their expectations regarding interventions and methods of solving problems arising during the early years of teaching and their expectations as to how the PDPs would cover different areas such as the curriculum, assessment methods and new teaching trends. Evidence was collected from the perspectives both of officials (policymakers at the MoE and policy implementers in the governorates) and of NSTs themselves, in order to examine the quality of PDPs and to compare this with stakeholders' expectations.

The literature review contributed to the development of this question by identifying the factors driving education systems to address the problem of the high attrition rates that occur among NSTs (Inman and Marlow 2004; Watson 2006). The review also facilitated an understanding of the perceptions of NSTs of the challenges they face, as contributors to the existing literature report that NSTs face more sophisticated challenges in planning and teaching compared to teachers of other disciplines (Sanford 1988). Others identify the main factors motivating NSTs to leave the profession, including dissatisfaction resulting from poor administrative and other forms of support and from poor pay (Watson 2006),

as well as problems of student discipline, lack of faculty influence and poor opportunities for advancement (Ingersoll, Merrill and May 2012; Ingersoll and Smith 2004). Reviewing the literature on all of these issues helped to deepen my understanding of the perceptions of NSTs and then to discuss them.

RQ3 From the perspectives of key stakeholders, how successful has the policy been in terms of implementation and impact on the professional learning and practice of novice science teachers?

The final research question focuses on two key aspects of perceptions regarding the policy on PD for NSTs from the point of view of stakeholders: the extent to which they perceive the policy to have succeeded in implementation and impact, and the similarities and differences among the three stakeholder groups (policymakers, implementers and teachers; see Section 4.7) in terms of these perceptions. The first issue was addressed by investigating three sub-questions: Does the new policy work? Is its implementation effective? Do NSTs perceive it as meeting their needs? Finally, a comparative analysis was conducted of the various stakeholder groups' perceptions of the success of key aspects of the policy. The literature review had a major role in elaborating the third question, by elucidating the factors underlying the success of the professional development policy and the effectiveness of the associated methods in meeting the needs of NSTs in the early years of teaching (Fullan 2001; Ozturk and Hoard 2019; Postholm 2018; Saunders 2014; Senom, Zakaria and Ahmad Shah 2013; Wedell 2009).

An account of the methodology adopted to answer these questions now begins at the philosophical level by examining the research paradigm.

4.3 Research paradigm

A research paradigm is defined as "a cluster of beliefs and dictates which for scientists in a particular discipline influence what should be studied, how research should be done, how results should be interpreted and so on" (Bryman 2003, p.4). Taking into account the setting, the paradigm is at the top of the research hierarchy and can be seen as serving as a central pillar of any study, governing

decisions on various aspects of its conduct such as research principles, data collection methods, data analysis and sampling design (Bryman 2016).

Many textbooks distinguish two main research paradigms, namely the scientific and interpretive paradigms. Scientific research takes a positivist stance, adopting an objective view of the world and searching for truth through reality, whereas interpretative research takes a constructivist viewpoint according to which the researcher cannot be separated from the context in which he is searching, since the only source of information is his own subjective perceptions. Therefore, many different results can be obtained from similar investigations, because they depend on interactions between the inquirer and the individual or the social situation under scrutiny (Briggs, Morrison and Coleman 2012; Robson and McCartan 2016; Thomas 2017).

Interpretive or qualitative research relies on “induction, discovery, exploration, theory/hypothesis generation, the researcher as the primary instrument of data collection and qualitative analysis”, while scientific research is essentially quantitative and relies on “deduction, confirmation, theory hypothesis testing, explanation, prediction, centralized data collection, and statistical analysis” (Johnson and Onwuegbuzie 2004, p.18).

An alternative to taking a purely quantitative or qualitative approach is to adopt the pragmatist paradigm, in which the two are combined to produce a mixed research approach, as has been done in the present research. Schoonenboom and Johnson (2017) describe pragmatism as characterized by “warranted assertibility”, meaning the ability to gather strong evidence on the claims related to the subject being investigated. Denzin and Lincoln (2011, p.83) also explain that “pragmatism is the research paradigm that supports mixed or multiple methods of social research”. Therefore, this study has adopted a research design taking the quantitative and qualitative approaches in succession to explore deeper and broader responses from stakeholders regarding the policy on PD for NSTs in the Omani context.

The pragmatist paradigm was adopted to allow qualitative data enhance the depth of stakeholders’ responses, so that rather than being limited to broader statistical conclusions drawn from the quantitative responses of all novice science

teachers in Oman about their professional development policy, it also provided an opportunity to explore differences among stakeholders in their subjective responses. The choice of this paradigm arose from the premise that it combines qualitative and quantitative approaches and thus reveals information that is difficult to obtain from one approach alone. In addition, such mixed-method research on novice teachers has rarely been conducted in Oman. While clear distinctions can be made between qualitative and quantitative research, there are areas of connection between them and the two approaches can be combined. Indeed, it is often desirable to do so (Bryman 2016), because of the advantages and benefits of a mixed-method research design.

4.4 Mixed-method design

A mixed-method research design was therefore used in this study to investigate stakeholders' perceptions and experiences regarding the policy on the PD of NSTs in Oman. In mixed-method research, data are collected and analysed by a mix of quantitative and qualitative methods (Creswell and Creswell 2017). It is important to realize, however, that mixed-method research involves more than merely mixing data collection methods, but rather means adopting "multiple perspectives, theories, methods of data collection on understanding a particular phenomenon" (Johnson and Christensen 2019, p.470).

This study has integrated quantitative and qualitative methods by applying multiple variables and sampling methods when selecting stakeholders. Mixed methods helped to understand the phenomenon of interest from the various stakeholders' perspectives, as well as analysing relevant policies and documents. Therefore, two main paradigms were applied: one based on scientific terms and the other on the interpretive approach (Robson and McCartan 2016; Briggs, Morrison and Coleman 2012; Thomas 2013). This study was heavily weighted towards the latter, involving the use of interviews and document analysis, because the research questions focus on obtaining detailed descriptions of the phenomenon under investigation, particularly the factors, expectations and deeper insights of stakeholders regarding the PD of NSTs.

Hammersley (2002, pp.168-176) indicates that using three methods of data collection—in the present case, a quantitative survey, qualitative interviews and

document analysis—will help to ensure the accuracy of the data obtained. Denzin and Lincoln (2011) describe the benefit of using such triangulation in a mixed-method approach as follows: “The bias inherent in any particular data source, investigator, and method will be cancelled out when used in conjunction with other data sources, investigators, and methods” (p.14). They also suggest that findings on social phenomena are closer to reality when triangulation is used.

Therefore, data were collected by analysing MoE policy documents, followed by a questionnaire and qualitative interviews. As Hammersley (2002) points out, the data from the qualitative interviews will support the quantitative results. These are the general principles in the design of mixed-method research. In this study, the results obtained from the questionnaire responses of NSTs were used to develop follow-up questions deployed in individual interviews with them. Data from document analysis were also used to support interview questions for other stakeholders. This approach helped to improve the quality of the results, as the results obtained from the quantitative tool complemented the results obtained from the qualitative instrument, which in turn generated more reliable information (Creswell 2011). Bryman (2016) confirms that “the research methods associated with both quantitative and qualitative research have their strengths and weaknesses, so that combining them in a single study allows the researcher to offset the weaknesses and to draw on the strengths of both”.

The current literature uses diverse terms to refer to many mixed designs (Creswell 2011). It may not be appropriate here to discuss the characteristics of each design, but it is important to mention three common mixed designs in educational research, namely the exploratory sequential, explanatory sequential and convergent parallel designs. In this study, a convergent parallel mixed design (Figure 4.1) was chosen to collect more comprehensive, extensive and detailed information on NSTs’ PD in Oman. This design, which is the most common mixed type, requires the researcher to collect quantitative and qualitative data, to analyse them separately, then to compare them to determine the extent of compatibility or difference between them (Creswell and Creswell 2017).

An issue that should also be considered when designing a study is trustworthiness, which refers to “the authenticity and consistency of

interpretations grounded in data" (Yeh and Inman 2007, p.386). This study follows Lincoln's and Guba's (1985) principles of trustworthiness: credibility, dependability, confirmability and transferability. Credibility means making sure that the study investigates its intended purpose, either in terms of the results agreeing with the data obtained or matching with reality (Merriam 2009). To achieve this, I adopted methods that were used successfully in previous research and triangulated them by using three different methods to collect quantitative and qualitative data. In addition, I correlated the results of this study with existing knowledge through examination of previous studies and took advantage of my familiarity with the context of the study and choice of participants, because I had worked on teachers' PD earlier in my career. These procedures contributed to providing an accurate presentation of the phenomenon under study.

The second principle of trustworthiness is dependability or reliability, which refers to the possibility of replicating the study in different contexts (Lincoln and Guba 1985). Providing "in-depth coverage" of study design and implementation, and using various methods of data collection will help future researchers "to repeat the work, if not necessarily to gain the same results" (Shenton 2004, p.71). In this study, several measures were taken to ensure dependability (see Sections 4.8.2 & 4.8.6).

The third principle, confirmability, refers in interpretive epistemological research to the measures taken "to ensure as far as possible that the work's findings are the results of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher" (Shenton 2004, p.72). In this study, all participants are quoted verbatim and referred to by pseudonyms. The quotes used were reviewed by a third party to ensure the correctness of transmission (see Section 4.8.2.3).

The final principle contributing to trustworthiness is transferability, which indicates how feasible it is to apply the findings of a study to a different context. This study provides sufficient details of the location of the research, the participants and the tools used to collect the data, with the aim of enabling readers to determine whether its results would be applicable to their own different contexts (see

Sections 4.8.2.8 & 4.8.7). The following sections discuss these principles in more detail.

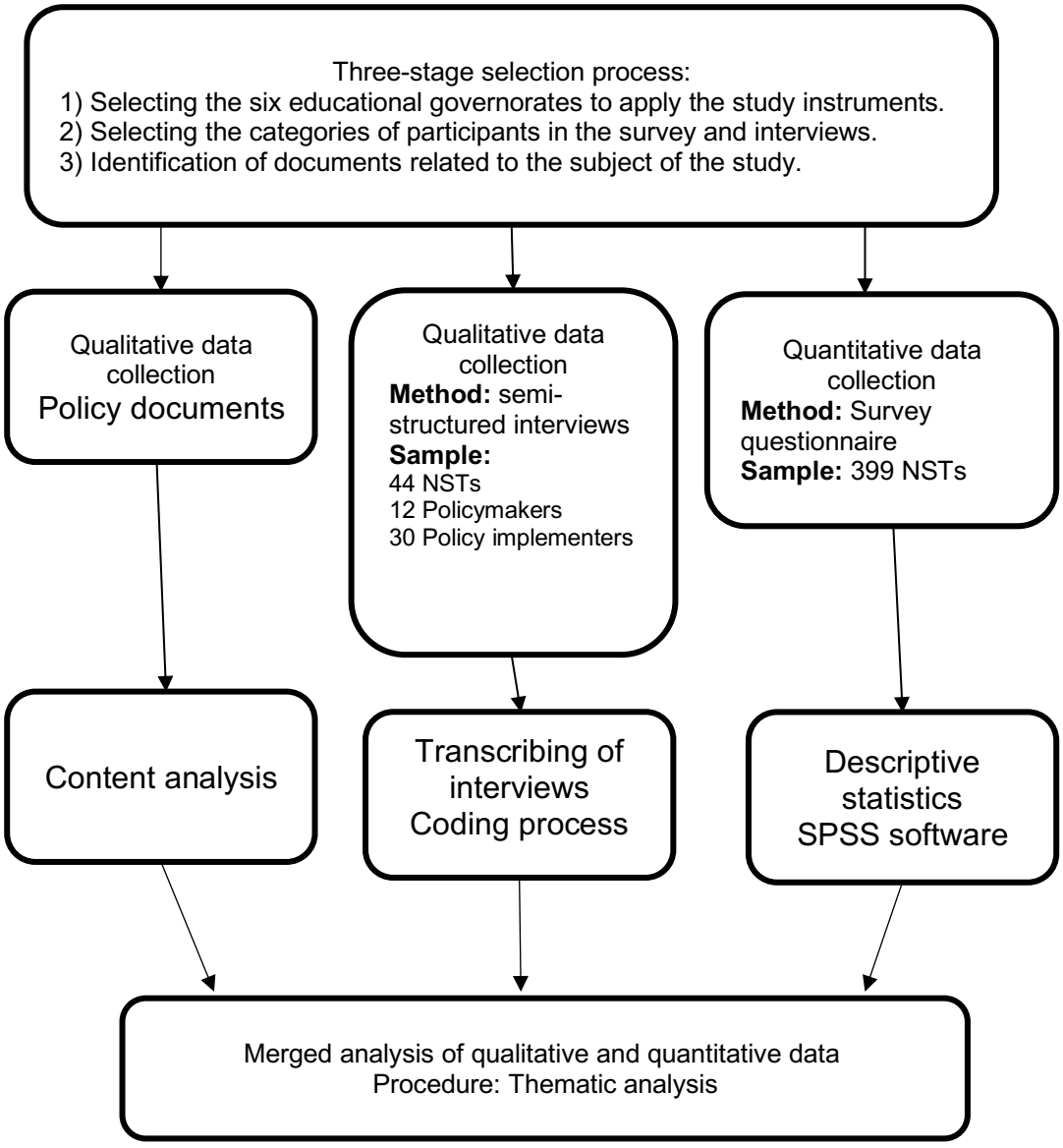


Figure 4.1: Mixed-method convergent parallel design and analytic procedures

4.5 Methods of data collection

This study used three types of research instrument, namely document analysis, questionnaires and individual interviews, generating different forms of data that are unique in terms of the information provided. Hammersley (2002) identifies three reasons (triangulation, facilitation and complementarity) to use quantitative and qualitative approaches simultaneously in order to achieve validity and trustworthiness.

This study used methodological triangulation, i.e. the use of different methods of data collection to investigate the same topic. Respondent triangulation was also used, allowing the researcher to ask similar questions of many different stakeholders (Briggs, Morrison and Coleman 2012), in order to obtain the views of stakeholders from different departments and governorates.

4.5.1 Document analysis

Document analysis was an important part of this study. The analysis of documents is particularly valuable in policy-related research because it will tend to reveal any discrepancy between written policy objectives and their interpretation as reported in individual interviews (Briggs, Morrison and Coleman 2012).

Available data were gathered from documents related to the main components of the study, such as issues of politics, education reform and developments across the cultural context, in preparation for the collection of survey and interview data in the field. Lampard and Pole (2015) affirm that documents are “a form of existing data” and are used at an initial stage of data collection because they “form the basic and original materials for providing the researcher’s raw evidence”. Another reason for using documentary analysis is to improve internal validity (Sapsford and Jupp 1996) and—as noted above—as a method of systematic triangulation with other data collection methods that were used in this study.

Various documents related to the centre (MoE directorates) and the periphery (governorates and schools) were analysed so that data from multilevel perspectives could be compared with other sources. Documents setting out the new policy on the PD of novice science teachers were very limited and did not meet the requirements for answering the research questions, which led me to conclude that it would be necessary to supplement these with other data collection methods. Data were extracted from documents by means of content analysis, which Klenke (2008) describes as revealing “the existence of some concepts within texts”, meaning articles, books, historical documents and newspapers.

Document analysis reflected the vision of policymakers and the importance ascribed to the PD of NSTs. Among the documents analysed were MoE and

governorate-level annual teacher-training plans for 2011–2018, including descriptions of the training programmes provided for all teachers in the different governorates, in order to understand policymakers' perceptions of training programmes for NSTs and more particularly the factors behind this policy. The printed manual issued by the SIPTT was also analysed, in addition to the Institute's website, accessed via the MoE's educational portal, and the SIPTT's accounts on both Twitter and Facebook. Other documents analysed were the Manual of Professional Development and the Rehabilitation Studies issued by the General Directorate for Human Resources Development, the School Manual as a unit for professional development, and the guide to preparing the governorates training plan for the year 2018.

I designed an analysis form for these documents, with columns for the name of the document, date of issue, source, contents of the document, quotes from the text and page numbers, which helped considerably in organizing the data, in classifying documents and later in the coding process. The form reflected the approach of Taylor (1997) to document analysis, which relates to critical policy analysis and consists of three stages. The first stage considers the context or background of the policy by asking questions such as 'Why did this policy come about?' and 'What issues does it seek to address?' Thus, when analysing the annual teacher-training plan, I looked for an introductory section that explains why the policy of training NSTs was necessary. The second stage looked at text or policy related to the types of training programmes. I also reviewed the methods and strategies that played a role in supporting NSTs, as described in the documents. Since this study was concerned with teacher-training plans for 2011–2018, analysis of changes between one year and the next would reveal why these changes were made or why the new policy or an amended policy was introduced. The third stage in Taylor's framework looks at the consequences, implementation and impact of the policy. This study examined the perspectives of respondents regarding an implemented policy using interviews and questionnaires, thus revealing the congruence and divergence between written policy and actual policy (Taylor 1997).

4.5.2 Individual interviews

An interview is a method that allows participants to express their opinions and discuss their interpretations of a context or situation (Cohen, Manion and Morrison 2013). This study employed qualitative interviews as "a participative activity to generate knowledge" (Shah 2004, p.545), which allowed the researcher to gather supplementary information about these issues (Frankfort-Nachmias and Nachmias 2007). I used semi-structured interviews because they are flexible in terms of order and clarification of terms (Burns 2000), allowing me to cover various topics with the freedom to reorganize the questions as needed (Thomas 2017). Semi-structured interviews permit the researcher to arrange ideas and sequences and to seek clarification of answers. The interviewer can also practice a certain amount of control to avoid deviating from the research topic. Another feature of the interview emphasized by Robson (2002) is that interesting responses can be pursued and the underlying drivers behind them investigated. Wellington (2015) indicates that interviews also help the researcher to access data that cannot be obtained using other methods. Finally, they give interviewees the opportunity to express their views and add comments and ideas, which can enrich the interview.

The language of the interview is an important issue in preparing the study. Wragg (2002) highlights this consideration in settings where research participants speak a different language from that of the researcher. Being an internal researcher was a great benefit to me in this respect, as I needed no interpreter or any other means of understanding the language used in the cultural context, taking into account the multiplicity of dialects of Arabic in the various regions of Oman, with significant differences between the north and south of the country. (The issue of translation is addressed in Section 4.5.5.)

The interviewees comprised three groups of stakeholders: policymakers, policy implementers and NSTs. The first round of interviews was divided into two parts: I interviewed MoE policymakers working on the PDPs offered to NSTs, as well as people involved in the implementation of programmes for NSTs in the governorates, such as the Director-General of the Governorate, the Director of the Human Resources Development Department or Head of the Training Centre, supervisors, trainers or principals and senior science teachers. The second round

consisted of semi-structured interviews with 30 female and 10 male NSTs working in six of Oman's eleven governorates.

These interviews were conducted in person and were guided by an interview schedule for each group of stakeholders (policymakers and policy implementers), consisting of a list of topics to be covered in the interview but allowing the researcher freedom to ask follow-up questions (Thomas 2017) (see Appendices A and B). In the case of the NSTs, I used this as an opportunity to ask questions which followed up from the questionnaire (see Appendix C). These methods thus complemented one another, providing information that could not have been obtained from any single method alone. This complementarity is one of Hammersley (2002) key components for strengthening research methodology.

The interviews were audio-recorded using a recorder purchased for this study, after participants had given their permission and informed consent. This procedure provided another opportunity to communicate with the participants after the interview, rather than having to stop to make detailed written notes (Chapman, McNeill and Mcneill 2005). In addition, I designed a special form on which to take immediate notes of great value during the interview, which served several purposes, including not interrupting interviewees' flow of speech and being prompted by valuable information to prepare supplementary questions for a particular participant, in addition to evaluating the interview and the issues raised in order to develop the next interview. This form consisted of three parts, the first for recording basic facts about the interviewee, such as number, name, day, date, job and interview time. In the second part, I recorded the observations made during the interview and in the third, the most prominent points that came out of the interview.

4.5.3 Questionnaire

The use of questionnaires in research is characterized by efficiency in terms of saving time, effort and cost, collecting plentiful data from a large number of people during a relatively limited period of time (Dörnyei and Taguchi 2009; Fowler 2013). A questionnaire also obviates the need for direct contact between the researcher and the study participants, thus minimizing the risk that the researcher will influence respondents in terms of the conduct and mode of the research

(Burns 2000). Further benefits of not requiring the presence of the researcher on site during the completion of the questionnaire are that the identity of the researcher is not revealed to the participants and that they are more likely to feel free to answer explicitly and directly (Frankfort-Nachmias and Nachmias 2007). Because of its characteristics, the questionnaire is “widely used to collect numerical information from participants in studies in large geographical areas” (Cohen, Manion and Morrison 2013, p.377).

A questionnaire was used in the present study for two purposes: to investigate the expectations of novice science teachers regarding the methods used to implement their PDPs and to examine their experiences of the programmes offered by the MoE at the SIPTT, in governorates and in schools. Most items in the questionnaire used a five-point Likert-type rating scale with scores ranging from five (strongly agree) to one (strongly disagree), which is considered an “excellent means of gathering opinions, attitudes and an approach to data generation based on attitude ratings they can relate to terms other than agree or disagree” Anderson, Anderson and Arsenault (1998, p.175).

Since there were as many as 468 participants in the NST group and since they worked in six different governorates, the questionnaire was the most suitable research tool with which to gather data from them. Research literature indicates that questionnaires are a suitable tool for investigating teachers’ perceptions in general, including with regard to professional development programmes (see, for example, Karabenick and Noda 2004).

The questionnaire consisted of five parts. The first elicited personal details included gender, governorate, place of graduation, number of years of teaching experience, teaching location, cycle of teaching and number of training courses attended since being employed by the MoE. The second part comprised 28 items interrogating the novices’ expectations of the methods used in implementing PDPs, while the third contained 26 items examining their experience of the programmes offered by the MoE at the SIPTT and in the governorates and schools. The fourth section differed in comprising five open-ended questions that allowed the NSTs to express their views of the effectiveness of the PDPs delivered at the three levels in assisting them to teach, in addition to their views

about activities that might help them to develop professionally and the effectiveness of the governorate-level and school-level programmes in doing so. These questions were designed to elicit deeper insights into the effectiveness of PDPs designed for NSTs. The fifth and final section of the questionnaire was an invitation to participating teachers to attend individual interviews designed to obtain in-depth information based on the questionnaire responses about the professional development programmes provided to them (see Appendix D).

The questionnaire was constructed around themes that appear consistently in the reviewed literature (Al-Lamki 2009; Alsharari 2016; Cheong 2005; Davis and Cearley-Key 2016; Hustler et al. 2003; Taylor 2002):

1. The importance of PD in the early years of teaching.
2. The suitability, quality, adequacy and regularity of training.
3. Teachers' needs in terms of the content of training programmes.
4. The role of NSTs in designing their own training plans.
5. Suggested types of in-service training activities.
6. The expectations and experiences of NSTs about PD.

Having obtained permission to administer the questionnaire from the MoE head office and from the offices of each of the six participating governorates, I handed over the questionnaire forms with the instructions in large envelopes to the Technical Office for Studies and Development, to be distributed to governorates and schools. The TOSD sent them via the internal mail to the governorates, which sent them on by post to the schools. This step in the distribution of the questionnaires and in their retrieval was managed by specialized staff at the office of the Director-General in each governorate, who were briefed on the limitations of distributing and retrieving the questionnaire and were asked to take these into consideration while encouraging NSTs in their schools to fill out all parts of the questionnaire and to ensure the return of the largest possible number of duly completed questionnaires.

4.5.4 Combining of data collection instruments

The quality and rigour of this study, as discussed in Section 4.8, rely partly on the triangulation of research methods, whereby both qualitative and quantitative data were collected through the use of three different methods: document analysis, semi-structured interviews and questionnaires. Hantrais (2008, p.109) defines methodological triangulation as “the combination of two or more different research strategies to study the same empirical issue and corroborate findings”. Hammersley (2008) refers to four different interpretations of triangulation, including the checking of validity.

Based on this interpretation, I collected data from three different sources related to the same issues affecting the same stakeholders, which reduced the chances of reaching incorrect conclusions. Methodological triangulation allowed me to access deep and rich information, as the use of the questionnaire with NSTs helped me to understand multiple issues that facilitated the application of the individual interviews not only with NSTs, but with all stakeholders. Likewise, reviewing and analysing the documents provided me with a number of questions that helped to focus the interview questions for MoE policymakers and implementers. For example, analysis of the questionnaire responses of the NSTs, whether statistical or textual, from the open-ended questions, revealed a number of issues that I then sought to explore more broadly and more deeply during the individual interviews, such as the challenges facing NSTs in attending the PDPs offered to them. Likewise, my analysis of official documents showed me early on that most stakeholders, from policy implementers to NSTs, had no knowledge of the new policy goals and implementation plans. These findings again prompted further investigation through interview questions. Hammersley (2008) calls this principle ‘facilitation’.

Another aspect of data consolidation was that when organizing the data gathered from the three sources, I sorted them by theme or sub-theme. For example, I created a category for data on stakeholders’ expectations of methods of PD for NSTs, whether derived from questionnaire statistics, responses to open questions in the questionnaire, document analysis or interview transcripts. Thus, I combined data from diverse sources, employing the complementarity principle

and allowing me to present the findings using thematic analysis (Hammersley 2008), in order to organize the data in a manageable way. Thematic analysis is used extensively in qualitative research and is described by Braun, Clarke and Weate (2016, p.79) as “a method for identifying, analysing and reporting patterns within data”, where the word ‘patterns’ refers to themes. This was done in the present study by coding the data and then categorizing them into units related to specific themes (Creswell and Creswell 2017). The thematic analysis allowed me to present the findings related to one theme in one place, despite the different sources of data collection, as exemplified in Chapter 6, Section 6.3.4 and in Chapter 7, Section 7.3.3.

4.5.5 Translation and transparency

The headquarters of the MoE and of the governorates and the 32 participating schools, where the interviews were held and questionnaires were administered, are all in Oman, whose official language is Arabic. Therefore, the interviews were conducted in Arabic, while having written the questionnaire in English and submitted it to my supervisors and the transfer panel for approval, I then translated it into Arabic, taking care to avoid additional interference or overlapping terms where the translation presents a challenge for the researcher because it involves the translation of culture, as well as words (Xian 2008). In the translation, I took into account the specificity of the field in terms of appropriate words and expressions. Since the transparency of the translation is integral to maintaining research accuracy (Wong and Poon 2010), I had it revised by two experts in training at the MoE.

4.6 Participants and sampling

The following subsections describe the study participants and the research instruments which were applied to each group.

4.6.1 Study population

Although Oman has 11 educational governorates, this study was limited to six of them, for reasons of time, effort and financial cost. The following varied factors determined the selection of these six for inclusion in the study. The Governorate of Muscat is the capital of the country and is small in area, so its schools are

relatively close to MoE headquarters and enjoy access to all educational services, making it appropriate to investigate the stakeholders in this governorate. Musandam, a governorate located in the far north of Oman, has by contrast geographical features making it difficult to provide PD services to teachers, as some schools are on islands and can only be reached by boat. Dhofar lies in the far south, about 1,200 kilometres from MoE headquarters and its topography means that its population is distributed widely across mountains, deserts and islands. Therefore, many schools are remote and as a consequence employ a large proportion of short-term novice teachers in various subjects. In marked contrast, Al-Dhahirah Governorate enjoys a stable teaching staff with very few novice teachers. Al-Batinah South is one of the largest and most geographically diverse educational governorates in Oman, employing many novice teachers in coastal, mountain and urban schools. Finally, Al-Sharqiyah South is a medium-sized governorate in terms of the number of schools, but again its diversity constitutes a real contribution to the investigation, as it has schools on islands, in deserts and in cities. These six governorates were carefully chosen to represent the geographical and demographic diversity of Oman and the range of conditions under which its schools employ and provide PD services to novice science teachers.

4.6.2 Sampling

The sampling method is an integral part of the research design, because it plays a large role both in the effectiveness and value of the data collected and in determining the type of analysis to be used (Ritchie, Lewis and Elam 2003). Mason (2017) distinguishes between convenience sampling and purposive sampling. This study relies on purposive sampling, because all stakeholders (policymakers, policy implementers and NSTs) had specific characteristics making them essential to the investigation of the study topic.

The policymakers based at MoE headquarters who participated were chosen as officials of the four directorates responsible for the PDPs offered to all teachers, including NSTs, for following them up and for providing the required support, namely the SIPTT and the Directorates of Curriculum Development (abbreviated in Table 4.1 to DCD), Educational Assessment Development (EAD) and Human

Resources Development (HRD). For their part, the participating policy implementers, responsible for providing PDPs to NSTs in the governorate training centres and in schools, fell into five categories: General Director of the Governorate, Director of the Human Resources Development Department or Head of the Training Centre, science supervisors, trainers or principals, and senior science teachers. As for NSTs, the questionnaire was distributed to all of those employed in the six governorates (468 NSTs in total), of whom 399 completed the questionnaire. Finally, 44 NSTs were selected for interview from across the six governorates according to their positive response to a questionnaire item on willingness to participate in an individual interview, to their length of teaching experience, place of graduation, level of teaching and gender. The following sections explain this in detail, while Table 4.1 shows the number of interviews and questionnaires for each category of stakeholder at each site.

Table 4.1 Numbers of interviews and questionnaires by category and site

Site	Novice science teachers		Policy implementers	Policymakers				Total
	Interviews	Question-naires	Interviews	Interviews				
				DCD	EAD	HRD	SIPTT	
Ministry headquarters				2	2	2	6	12
Muscat	11	95	5					111
Musandam	4	52	5					61
Dhofar	4	65	5					74
Al-Dhahirah	8	46	5					59
Al-Sharqiyah South	5	62	5					72
Al-Batinah South	12	79	5					96
Total	443		30	12				485

4.6.3 Interview participants

The formats of individual interviews with policymakers, implementers and NSTs were based on a semi-structured protocol. The sample of 12 policymakers and 30 policy implementers (see Table 4.1) was selected purposively from the Ministry of Education and from the governorates, based on criteria intended to ensure that the interviews would enrich my understanding of the phenomena under investigation. The selection of both officials and NSTs considered the maximum variation within a broad range of length of experience, place of graduation, level of teaching and gender to add different perspectives to the

study. For example, I interviewed policymakers and policy implementers with long experience of designing and formulating the Ministry's training policy for NSTs. I also selected as participants unusual NSTs; in other words, those with specific experience and having a critical and unique perspective on the issue under study were included.

I employed two different means of recruiting participants whose contribution might enrich the investigation. First, my experience and networking in the MoE facilitated my access to a rich body of participants, in line with the assertion of Marshall (1996, p.523) that "a key informant sample may be able to recommend useful potential candidates for study". I also focused on those who would support emerging explanations or who would confirm or disconfirm the issue under study. The second means of recruitment was to introduce an element of convenience, which may be seen in many qualitative studies (Marshall 1996; Noy 2008). For example, the 10 male and 34 female NSTs from six governorates (Table 4.1) whom I interviewed were selected according to their positive response to a questionnaire item on willingness to participate in an individual interview, to their length of teaching experience, place of graduation, level of teaching and gender. I also considered an issue related to this study, in that the results of the questionnaire revealed that there were three groups of science teachers whom the Ministry classified as novices and who were therefore eligible to join the novice teacher programmes implemented by the SIPTT. Group 1 consisted of NSTs who had not yet enrolled in any training programme, whether in the SIPTT, the governorate or school, and who had begun work at the MoE in the year that the study was conducted; group 2 comprised NSTs who had undertaken two phases of the programme provided by the SIPTT and who had two phases left; and those in the third group had completed the SIPTT's NST programme and had been recruited two years before the study was conducted. The diversity among these groups helped to enrich the interview data.

4.6.4 Questionnaire sample

Official statistics indicate that there are currently 725 Omani NSTs in Cycle 1 and 2 schools across the 11 governorates (MoE 2017). The questionnaire covered all schools in the six governorates identified in Section 4.7.1 that employed novice

science teachers with less than three years of teaching experience. The questionnaire was distributed to 468 NSTs in 202 schools, representing the study community in the six governorates. Of the 399 who responded by completing the questionnaire, 389 were females and ten were male. Thus, 85.25% of the total number of questionnaires distributed were recovered (see Table 4.1).

4.7 Stages of data collection

The data were collected in four stages: 1) the piloting stage; 2) document analysis; 3) interviews with policymakers and policy implementers; 4) the questionnaire and follow-up interviews with NSTs.

4.7.1 Piloting stage

The piloting stage of the study was conducted between 19 November and 7 December 2017, in the governorate of Al-Dakhliyah (bordering Al-Dhahirah, Al-Batinah South and Muscat, coloured orange in Figure 4.2). The main aims of the pilot study were to examine the instruments to be used, to investigate any possible communication issues in conducting interviews or distribution difficulties in sending questionnaires to the various governorates and requesting the documentation for analysis. In addition, it was intended to refine the instrument items. The literature review and the context of the background shaped the design of the questionnaire. The document analysis and interviews with government officials also informed some of the issues raised in the questionnaire. However, they were not sufficient to cover all issues related to the PD of NSTs. Therefore, a focus group session was held as a pilot study for the questionnaire. This open and flexible interview involved six NSTs from the Al-Dakhliyah governorate, in order to gain an understanding of PD for NSTs that might not be available in the literature. The participants' responses provided insights that could not be obtained through the questionnaire; thus, it was useful for developing the questionnaire items (Krueger and Casey 2014). The focus group also widened the methodological base of the research by providing an additional source of information. Finally, as expected, everybody within the group agreed to keep the discussions confidential.

The study instruments were applied to a sample similar to that of the main study. For example, I analysed the plan for teacher training for 2015, then conducted individual interviews with four officials from the Al-Dakhliyah governorate, namely the Director of the Department of Human Resources Development, the Head of the training centre, a science supervisor and a trainer. As for the questionnaire, I administered this to 20 NSTs from schools in the same governorate, then chose two of these teachers (one male and one female) to participate in the follow-up interviews. I analysed the pilot study data after transcribing the audio recordings of the interviews and translating these and the questionnaire responses, then wrote a detailed explanation of all of the procedures carried out in the pilot study, as well as the results and observations, which I submitted to my PhD supervisors before starting to collect data for the main study itself.

The piloting stage contributed to the later development of data collection mechanisms. One of its benefits was that I realized that the new policy documents could not be obtained by the SIPTT for several reasons. In light of this, I decided to involve the heads of the Ministry's general directorates and the six governorates in interviews, because they were familiar with the policies of the MoE, allowing matters related to policy on the professional development of NSTs to be covered by the data obtained from them. During the pilot interviews, I used terms such as 'stakeholders', 'policymakers' and 'implementers', but came to realize that NSTs were not familiar with them; I therefore resorted to using alternatives that they did understand. I also changed the wording of some items in the second part of the questionnaire, such as numbers 17, 20 and 24, because eight NSTs had asked me to clarify their meaning. Finally, I acquired some essential skills that proved valuable when visiting schools to conduct interviews for the main study, the most important of which were providing written information about the study and ensuring prior coordination with the school administration in identifying a suitable location to conduct interviews undisturbed.

4.7.2 Document analysis

The first phase of data collection in the main study involved submitting texts directly related to the first research question to document analysis (Taylor 1997), in order to identify the factors that led to the MoE's interest or lack of interest in

this category of teachers. This was achieved by tracking the number of programmes listed in the Ministry's training plan for NSTs at the central level or at the level of training centres in the governorates. This analysis also focused on the programmes presented in the plan in terms of its objectives and the quality of the programmes. In addition, the printed manual issued by the SIPTT was analysed, as were the Institute's website (accessed via the MoE portal) and its Twitter and Facebook accounts, in order to learn about the new policy on PDPs for NSTs. The information gathered at this stage facilitated and guided the interviews with all three groups of stakeholders.

4.7.3 Interviews with policymakers and policy implementers

At the second stage of data collection in the main study, I interviewed 12 policymakers, namely officials and trainers in the relevant MoE directorates and at the SIPTT. I also conducted five individual interviews in each of the six governorates, with policy implementers in the categories of General Director of the Governorate, Director of the Human Resources Development Department, Director of the Governorate Training Centre, Supervisor of Science and Senior Science Teacher. These interviews focused on key issues related to training NSTs in Oman with the aim of learning more about the policies pursued by the MoE in the governorates. They also explored the motivation behind this policy and the factors guiding it, as well as the Ministry's plan to further develop training programmes for NSTs. Thus, the information obtained from the interviews with government officials complemented the data obtained through the document analysis, to provide a clearer picture of the factors behind the MoE's policies.

Two weeks before the start of interviews in each governorate, I sent all interviewees a plan setting out the date, place, time and duration of the interviews. I also sent three files to each interviewee. The first included a letter of welcome giving the title of the study and explaining the importance of the addressee's participation; the second was a participant information sheet, defining key terms such as 'novice teacher' and 'stakeholder' and explaining aims of the study, what was required of participants and how the researcher would manage the confidentiality, use and storage of data; and the third file contained a participant consent form.

All interviews with policy implementers and NSTs were held in their workplaces in their respective governorates. I travelled in my own car to four of them: Muscat, Al-Dhahirah, Al Batinah South and Al-Sharqiyah South, the overall distance covered being 2,600 km, while I travelled by plane to the governorates of Dhofar and Musandam, which, as Figure 4.2 shows, are the most southerly and northerly respectively in the Sultanate, located around 1000 km from the capital, Muscat. In these two cases, I rented lodging and a car when visiting schools. I kept in constant contact by telephone and WhatsApp with the interview coordinators in each governorate to ensure that the plan was implemented to the maximum extent possible.

Individual interviews with policymakers lasted from 30 to 40 minutes, whereas those with implementers lasted from 40 to 45 minutes. Suitable workplace venues for interviews with implementers and NSTs were arranged with the governorate authorities, while policymakers were interviewed in their offices at MoE headquarters.

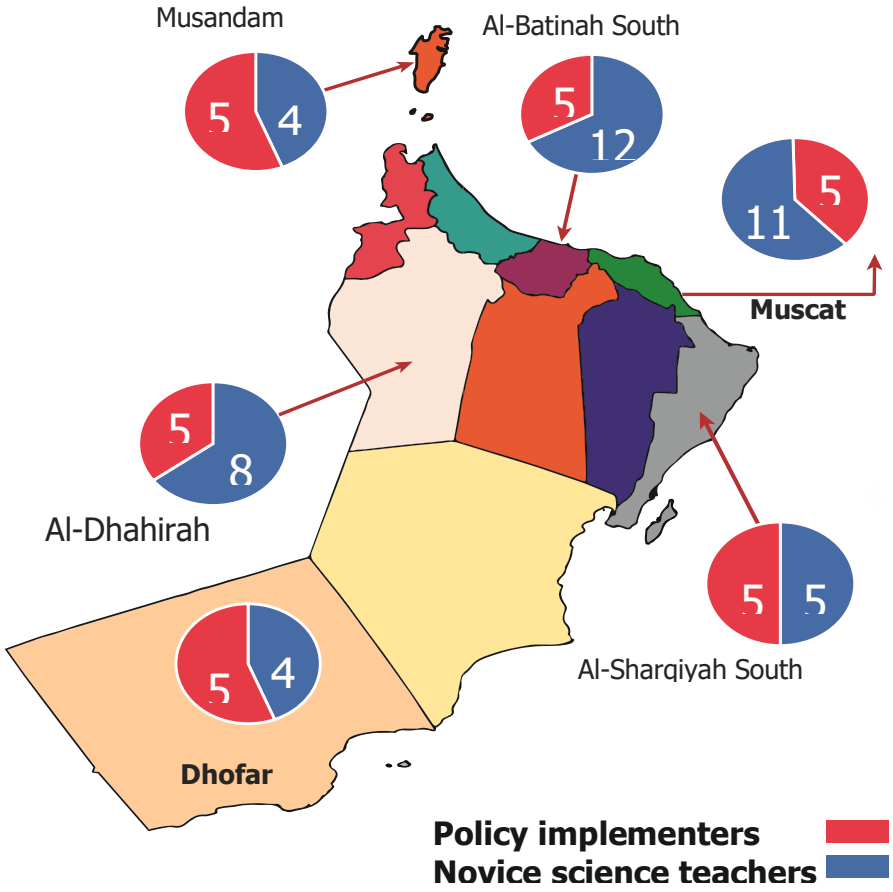


Figure 4.2 Number of interviewees in each governorate

I recorded all interviews and after completion of the recordings I transferred them to M-Drive to ensure confidentiality and security of storage. The 42 interviews with policymakers and policy implementers generated around 28 hours of recordings. I also designed a form on which to write remarks during the interview, in order to get feedback from each interview and to record the main points mentioned. All of these forms were collected in a separate file which I called 'Interviews memo'.

4.7.4 Questionnaire and follow-up interviews with NSTs

In the final stage of data collection, questionnaires were administered to 468 NSTs in the six governorates, 44 of whom I then interviewed, with the aim of augmenting their questionnaire responses by generating in-depth data on their perceptions of the PDPs provided to them by the MoE at the three levels. It also provided a picture of their positive and negative expectations regarding the ability of these programmes to address the challenges they faced at this stage.

The questionnaires were distributed in envelopes to a coordinator in each governorate, whose task, explained in written instructions accompanying the distribution of the questionnaire, was to check the number of envelopes received by each school against an attached list of school names and the numbers of NSTs targeted in each school. These coordinators distributed the questionnaire from Sunday 11 February 2018, so that the target group would complete the questionnaire and return it to coordinators by 22 March, as stated in the instructions.

The questionnaire responses revealed many interesting statistical patterns. Therefore, it was useful to interview a sample of the NSTs to investigate why these patterns existed. These 44 interviewees were selected in proportion to the number of NSTs in the six governorates, divided into three groups: Musandam and Al-Dhahirah; Dhofar and Al-Sharqiyah South; Muscat and Al Batinah South (See Figure 4.2 and Section 4.7.2). Each NST interview lasted about half an hour.

I again recorded the interviews and after completion transferred the recordings to M-Drive to ensure confidentiality and security of storage. The NST interviews

generated around 22 hours of recordings. As with the Stage 2 interviews, I kept notes on a form I had designed and saved these in the 'Interviews memo' file.

The interviews with NSTs focused on several issues, the most important of which were the professional development programmes which they had attended, the interest of the SIPTT, the governorate and the school in developing their skills, novices' expectations regarding the PDPs offered at the three levels and the effectiveness of the various programmes provided in meeting their needs. Interviews with NSTs also covered some issues that emerged from their responses to open questionnaire items, such as the challenges they faced and the support and follow-up they had experienced after training on the topics presented in their PDPs.

4.8 Research rigour

The quality of any research depends on the researcher's behaviour and on the procedures adopted, so that a review of these issues indicates the degree of confidence that one can have in the research results. The following subsections deal with the most important aspect of research quality and rigour.

4.8.1 Organization and analysis of quantitative data

The 399 completed questionnaires were organized by governorate for easy reference and each was given an individual identification number from 1 to 399. All responses to all questionnaire items were entered into the SPSS program, each being given a code indicating the section of questionnaire and the item number. For example, the first item in the first part of the questionnaire was coded as "p1_ 9". Responses to items in parts 2 and 3 were on a five-point scale, from 'Strongly agree' (1) to 'Strongly disagree' (5) and from 'Absolutely not important' to 'Very important' respectively. Where an item had no answer or more than one answer, I treated this as a missing value and encoded it '77'.

Before starting the quantitative data analysis I took the basic step of ensuring that there were no errors in the SPSS data file, in order to verify the validity of the data entered into the program, as Pallant (2013) recommends.

Participants' personal data, contained in responses to the first part of the questionnaire, were analysed through SPSS, providing an overview of the

participating NSTs (see Appendix E). Frequencies were then calculated for each item in the second and third parts, generating a detailed overview of the number of responses across the questionnaire, with the aim of providing insight into the general distribution of responses in the initial stages of the analysis (Bryman 2003). Next, descriptive statistics (frequency distributions, means and standard deviations) were calculated and presented in percentages of SPSS outputs (see Table 6.1 and Table 7.1).

A total of 390 participants responded to one or more of the five open-ended questions in part 4 of the questionnaire. I copied all of these responses, which together filled 29 A4 pages, then read the data thoroughly, asking myself while I was reading what else each response could mean until I recognize unit-meanings. The open-ended response data were next moved to NVivo, where they were coded by topic. At this stage, I generated as many categories of meaning-units as possible and selected a large number of them to prepare for a follow-up interview with novice science teachers. I then examined the connections between categories by comparing and contrasting them, both within and across the data (Corbin and Strauss 1990). To ensure inter-coder reliability, I sent some of my colleagues separately the transcripts of some open-ended questions, asked them to code each question, then compared the results to see whether the different coders had assigned the same or different codes (Miles and Huberman 1994).

It is important to affirm here that selective quotes from the questionnaire were used with the aim of illustrating the main and sub-themes in the results chapters, dictated by the necessity of answering the main research questions and the sub-questions emanating from them. Consequently, the data generated by the questionnaire were used only in an analysis designed to further illuminate some of the topics arising from examination of data obtained from document analysis and interview responses; the current study has not sought to make use of a comparative analysis of questionnaire data to expand the scope of the findings, such as by making a comparison among NSTs according to the governorates in which they worked or by comparing the responses of male and female participants.

4.8.2 Organization and analysis of qualitative data

Very large quantities of qualitative data were obtained from analysis of policy documents, interviews and open-ended questionnaire items; therefore, I performed an initial analysis to reduce the problem of information overload by selecting out significant elements for further investigation. Burden (2008) advises the researcher to use a broad-angle lens to gather data, then to sift, sort, review and reflect on them to find the significant features of the phenomenon in question.

The literature on research methods describes a wide variety of approaches to qualitative data analysis. However, these texts share one aim, which is to seek to understand the data collected in order to benefit from them by supporting the research arguments. In addition, consideration of the nature and amount of data and the purpose of the research will lead the researcher to clarify the approach that he will take to qualitative analysis (Braun and Clark 2006; Cohen et al. 2018; Creswell 2018; Kvale and Brinkmann 2009; Thomas 2017).

I followed two models in analysing the qualitative data, the first being that of Creswell (2005), which consists of six steps: data preparation and organization, exploration and coding of data, description of findings and formation of themes, representation and reporting of findings, interpretation of findings and validation of findings. The second model, related to the thematic analysis of Braun and Clark (2006), also comprises six steps: data recognition, creating initial codes, searching for themes, reviewing themes, naming themes and producing the report. Given the importance of adopting a model to fit my study, I combined these two with the aim of designing a data analysis process to suit the nature of my data and added two new steps: transcription as the second step and the translation of quotations as the sixth. This process can be described as continuous, because analysing and writing data is not a linear process but rather an iterative one, in which all stages affect each other. Therefore, although the model as applied had eight separate steps, I often performed two steps or more at the same time (Holliday 2016; Creswell 2005). Figure 4.3 illustrates the process of analysing data according to this modified model and the following eight subsections explain these steps with examples.

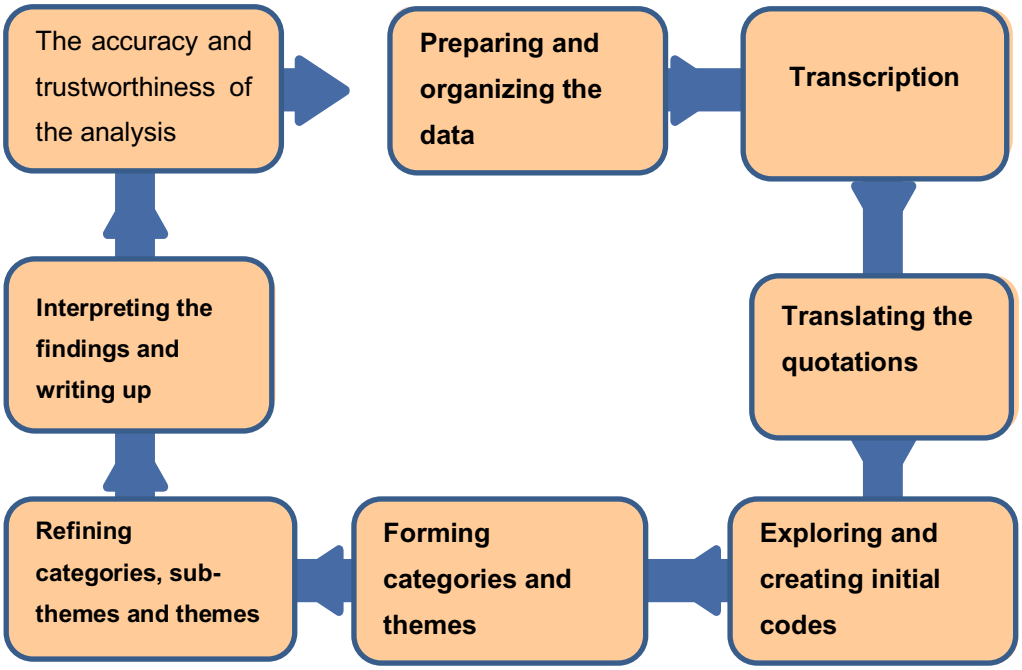


Figure 4.3: The data analysis process

(Based on the models of Creswell (2005) and Braun and Clark (2006) with my modifications)

4.8.2.1 Preparing and organizing the data

The first step was reviewing the data and writing analytical memos while conducting the interviews. This helped me to identify the salient features by identifying the frequencies of words and patterns of ideas related to the research topic. Exhaustive reading of the data helped me to note interesting patterns and any surprising or unexpected features such as inconsistencies and contradictions among stakeholders' responses. The writing of memos also helped me to clarify meaning units and note ideas (Punch 2013).

Next, I transferred the data from all 86 interviews from the recorder to the University's storage (M-Drive). I organized them in three folders, one containing interviews with the 12 MoE stakeholders, along with quotes from policy documents, the second including all 30 interviews with stakeholders involved in PDPs for novice science teachers in the six governorates, and the third containing the 44 interviews with NSTs.

I gave each interviewee a pseudonym to hide his or her identity while facilitating the accessibility of the large body of data for analysis. Each pseudonym consisted

of three parts, referring successively to the department, to the job and to the person interviewed.

4.8.2.2 Transcription

The second stage was transcription. I uploaded all of the interviews to NVivo, then tried to copy them directly from NVivo, but I was not able to do so. I therefore copied each into a Word document, then uploaded it back to NVivo. This method was necessary because NVivo does not support Arabic text, which led to me make several changes to the Word files so that they could be read by NVivo. The transcription of each interview took four times their length. All Word files were eventually uploaded to NVivo and each interview was stored in a separate file, with the aim of organizing all of the information in one place. Figure 4.4 shows how I used NVivo to support interview data written in Arabic.

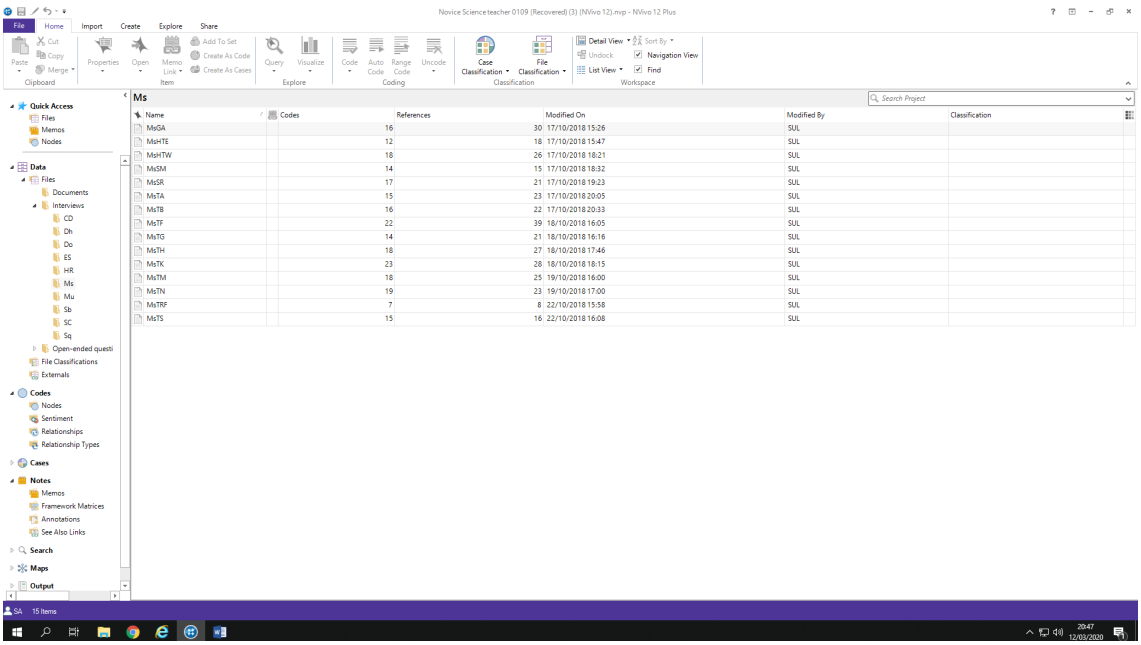


Figure 4.4: Use of Nvivo to support interview data written in Arabic

4.8.2.3Translating the quotations

The next stage was to translate into English the quotes that I had identified and classified as explained above. This can be seen as one of the most important stages of the analysis, because the thesis was to be written in English and it would be essential to ensure the accuracy and consistency of the language used. All of the interviews, as stated in Section 4.5.4, were conducted in Arabic, as it is the official language of all government institutions in Oman. The translation

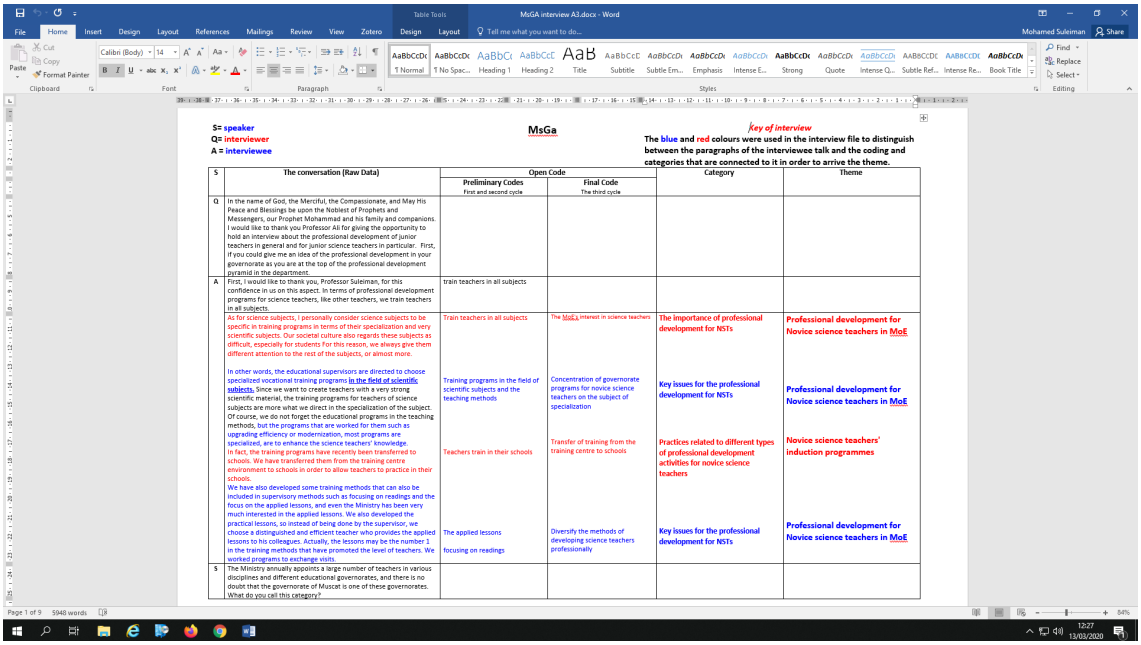
process was made somewhat more difficult by the fact that some interviewees, especially the NSTs, did not always adhere to standard Arabic but also used many colloquial terms and constructions from their local dialects. While all of these can be considered varieties of a single Arabic language, there are distinct differences of vocabulary, for example, between the Musandam Governorate in the far north of Oman and the southernmost governorate of the Sultanate, Dhofar, as well as marked differences in usage between coastal and mountainous areas. I therefore had to take great care in translating these interview extracts to be sure of clearly conveying the full meaning intended by each speaker.

Wong and Poon (2010) point out that the transparency of any translation is an integral part of maintaining the accuracy of a piece of research, a consideration which prompted me to present large samples of these texts to an Omani translator specializing in linguistics to ensure the correctness of my translations. This expert offered a number of suggestions regarding my translation of quotations. For example, the literal translation of some colloquial words would not make sense, so he advised me to first convert these to the equivalent in classical Arabic and then translate them into English. He also suggested the use of functional translation in some cases in order to preserve the intended meaning. One of the terms that I discussed with the translation expert was ‘educational reform’; as this is not found in Omani documents, he suggested expressing it with the corresponding English words ‘development’ or ‘improvement’. A final example is that participants referred to the roles of senior teacher and educational supervisor by using several different labels common among Omani educators; the expert suggested that I should use the official term found in MoE documents. To avoid any ambiguity, I have listed such terms in Section 1.6, which clarifies their intended meaning in this study.

4.8.2.4 Exploring and creating initial codes

Thematic analysis was applied to documents, interviews and open questions. This involved dividing data into codes, then those codes were condensed into categories and the categories into themes. This process was not particularly easy for me as a beginner. Therefore, in the first coding process, I coded one of the interviews manually on paper, following the steps suggested by Tesch (2013), which involved dividing the page into columns, putting the original text of the

interview in the first column (see Figure 4.5). I read the data carefully to extract its overall meaning, then looked for a word or abbreviation sufficiently close to whatever came to mind from my reading so that I could see at a glance what it meant. Next, I wrote this code for the meaning of the paragraph in the second column. Having completed these two processes for the transcripts of all interviews, I found that I had generated a list exceeding ninety codes. I now reviewed these codes against the data and modified or replaced them as necessary until the initial coding of each paragraph or phrase was settled by this 'back-and-forth' process. I then linked together any codes for closely related topics and condensed them into a number of categories (see Figure 4.6). This first-hand experience helped me to understand the coding method and improved my own indexing practice (Mason 2017). During the coding process, I kept the research questions in front of me, to serve as the focus of my reading and reviewing of all documents, interview transcripts and open-ended questionnaire responses. This focus helped me to organize the data during analysis into three basic topics, which later formed the themes of study and contributed to answering each of the research questions. This stage generated a list of 65 codes, which I entered into NVivo in order to help me in coding interviews, documents and open-ended questionnaire responses when working with the rest of the data. While working on the remaining data, I added codes, deleted some and merged others. Upon completing the coding and review and intensifying the topics, after recoded the data on the second and third readings, I found that there were now 70 codes (see Figure 4.7). This experience confirmed the assertion of Cohen, Manion and Morrison (2013) that coding is not a "one-off exercise".



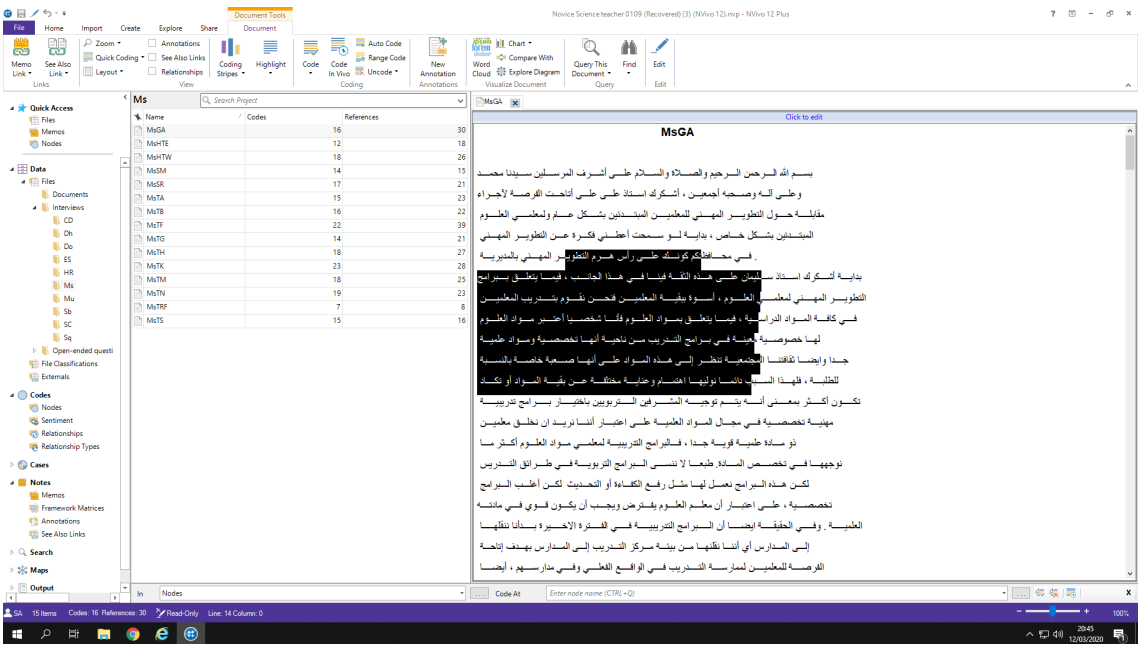
S= speaker
Q= interviewer
A = interviewee

MsGa

Key of interview
The blue and red colours were used in the interview file to distinguish between the paragraphs of the interviewee talk and the coding and categories that are connected to it in order to arrive the theme.

S	The conversation (Raw Data)	Open Code: Preliminary Codes (First and second cycle)	Open Code: Final Code (The third cycle)	Category	Theme
Q	In the name of God, the Merciful, the Compassionate, and May His Peace and Blessings be upon the Noblest of Prophets and Messengers, our Prophet Mohammad and his family and companions. I would like to thank you Professor Ali for giving the opportunity to hold an interview about the professional development of junior teachers in general and for junior science teachers in particular. First, If you could give me an idea of the professional development in your governorate as you are at the top of the professional development pyramid in the department.				
A	First, I would like to thank you, Professor Suleiman, for this confidence in us on this aspect. In terms of professional development programs for science teachers, like other teachers, we train teachers in all subjects.	train teachers in all subjects			
	As for science subjects, I personally consider science subjects to be specific in training programs in terms of their specialization and very scientific subjects. Our societal culture also regards these subjects as difficult, especially for students For this reason, we always give them different attention to the rest of the subjects, or almost more.	Train teachers in all subjects	The MoE's interest in science teachers	The importance of professional development for NSTs	Professional development for Novice science teachers in MoE
	In other words, the educational supervisors are directed to choose specialized vocational training programs in the field of scientific subjects. Since we want to create teachers with a very strong scientific material, the training programs for teachers of science subjects are more what we direct in the specialization of the subject. Of course, we do not forget the educational programs in the teaching methods, but the programs that are worked for them such as upgrading efficiency or modernization, most programs are specialized, are to enhance the science teachers' knowledge.	Training programs in the field of scientific subjects and the teaching methods	Concentration of governorate programs for novice science teachers on the subject of specialization	Key issues for the professional development for NSTs	Professional development for Novice science teachers in MoE
	In fact, the training programs have recently been transferred to schools. We have transferred them from the training centre environment to schools in order to allow teachers to practice in their schools.	Teachers train in their schools	Transfer of training from the training centre to schools	Practices related to different types of professional development activities for novice science teachers	Novice science teachers' induction programmes
	We have also developed some training methods that can also be included in supervisory methods such as focusing on readings and the focus on the applied lessons, and even the Ministry has been very much interested in the applied lessons. We also developed the practical lessons, so instead of being done by the supervisor, we choose a distinguished and efficient teacher who provides the applied lessons to his colleagues. Actually, the lessons may be the number 1 in the training methods that have promoted the level of teachers. We worked programs to exchange visits.	The applied lessons focusing on readings	Diversify the methods of developing science teachers professionally	Key issues for the professional development for NSTs	Professional development for Novice science teachers in MoE
S	The Ministry annually appoints a large number of teachers in various disciplines and different educational governorates, and there is no doubt that the governorate of Muscat is one of these governorates. What do you call this category?				

Figure 4.5: Manual coding of an interview, showing initial code, final code, category and theme for each extract



MsGA

بسم الله الرحمن الرحيم والصلاة والسلام على أشرف المرسلين سيدنا محمد
وعلى آله وصحبه أجمعين ، أشكرك استاذ على على أتاحت الفرصة لإجراء
مقابلة حول التطوير المهني للمعلمين المبتدئين بشكل عام ولمعلمي العلوم
المبتدئين بشكل خاص ، بداية لو سمحت أعطني فكرة عن التطوير المهني
في محافظتكم كونك على رأس هرم التطوير المهني بالمديرية .
بداية أشكرك استاذ سليمان على هذه اللفتة فيما في هذا الجانب ، فيما يتعلق ببرامج
التطوير المهني لمعلمي العلوم ، أسوة بقية المعلمين فنحن نقوم بتدريب المعلمين
في كافة المواد الدراسية ، فيما يتعلق بمواد العلوم فأنا شخصيا اعتبر مواد العلوم
لها خصوصية فيما في برامج التدريب من ناحية أنها تخصصية ومواد طلبة
جدا وأيضا ثقافتنا المجتمعية تنظر إلى هذه المواد على أنها صعبة خاصة بالنسبة
للطلبة ، فلهذا السبب دائما نوليها اهتمام وعناية مختلفة عن بقية المواد أو نكاد
نكون أكثر بمعنى أنه يتم توجيه المشرفين التربويين باختيار برامج تدريبية
مهنية تخصصية في مجال المواد العلمية على اعتبار أننا نريد ان نخلق معلمين
ذو مادة علمية قوية جدا ، فالبرامج التربوية لمعلمي مواد العلوم أكثر ما
توجهها في تخصص المادة طبعا لا ننسى البرامج التربوية في طرائق التدريس
لكن هذه البرامج نعمل لها مثل رفع الكفاءة أو التحديث لكن أغلب البرامج
تخصصية ، على اعتبار أن معلم العلوم يفترض ويجب أن يكون قوي في مادته
العلمية . وفي الحقيقة ايضا أن البرامج التربوية في الفترة الأخيرة بدأنا ننقلها
إلى المدارس أي أننا نقلها من بيئة مركز التدريب إلى المدارس بهدف إتاحة
الفرصة للمعلمين لممارسة التدريب في الواقع العملي وفي مدارسهم ، أيضا

Figure 4.6: Sample of a coded transcript

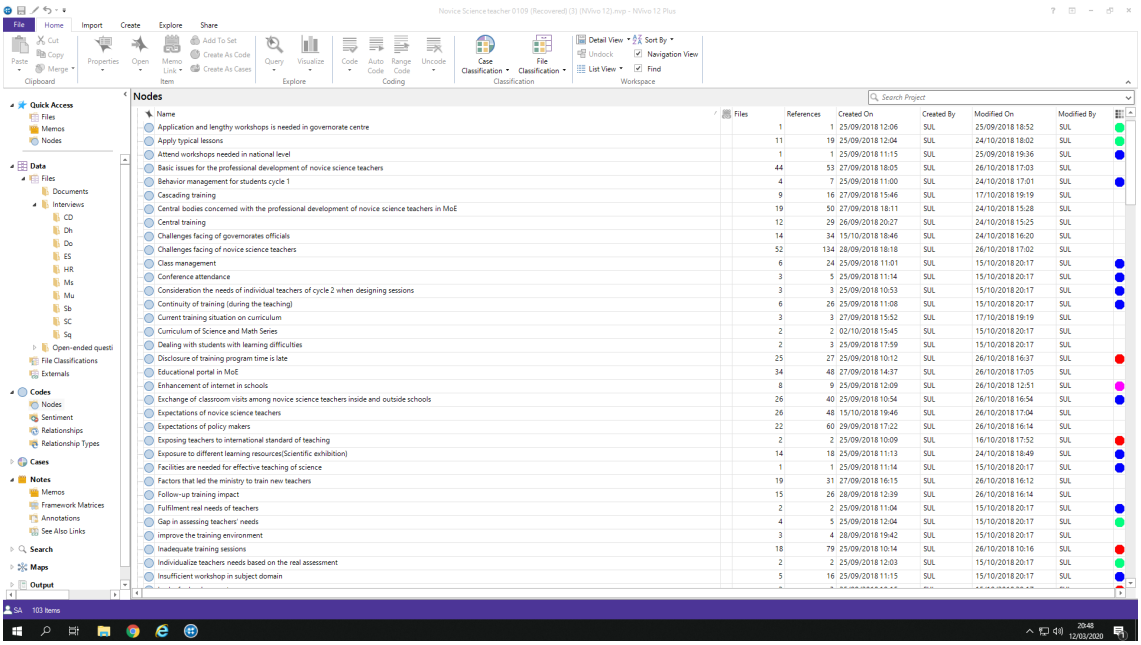


Figure 4.7: Final list of codes extracted from documents, interviews and open-ended questionnaire items

4.8.2.5 Forming categories and themes

The previous stage can be described as beginning the process of interpreting the data and thus of attributing meaning to them by encoding them, but the fact that it ended with the data being encoded does not mean that the process was complete. Given that some 70 codes were assigned, the dataset could not be managed in its current form, so it was necessary to undertake further steps to simplify the huge number of meanings and codes. I therefore performed what Cavalli and Brinkman (2002) call 'condensation', an iterative process based on a constant comparison method whereby a very wide range of symbols which cannot be managed in its present form is condensed into a smaller number of broader categories.

This was done by classifying a specific set of codes as category if all of those codes represented the treatment or discussion of a single issue. For example, in the transcripts of stakeholder interviews and some policy documents, there were references to a number of issues which had made the MoE reconsider its PD programmes for novice science teachers, namely the adoption of the Cambridge Science and Mathematics Series as a new curriculum in the Omani education system, the recruitment of NSTs in remote schools, weak student performance in the TIMSS international assessments, poor teacher preparation in major

components such as teaching methods and the application of assessment tools in some teacher preparation institutions, both inside and outside Oman, the loss of teaching skills resulting from NSTs waiting for more than four years to be appointed to teaching posts and the ambition of Oman to introduce educational reforms with a view to improving international competitiveness. These six issues were mentioned repeatedly and had therefore been assigned codes at the third stage. Now, the first three of these codes were condensed into a single category, that of internal factors which had led the MoE to provide professional development programmes for novice science teachers, while the remaining three were condensed to form the category of external factors leading the MoE to provide PDPs for NSTs. These two categories were next grouped under the broader heading of factors that led the MoE to provide PDPs for NSTs, which was classified as a sub-theme. Finally, this sub-theme was put together with a number of others to form one of the three main themes of the study, namely the new policy on the professional development of novice science teachers, which addressed the first research question and provided the heading to Chapter Five. Figure 4.8 shows a map of one of the main themes developed at the third stage, based on the intensification of the categories (sub-themes) from the second stage, with topics intensified from the first stage (the codes).

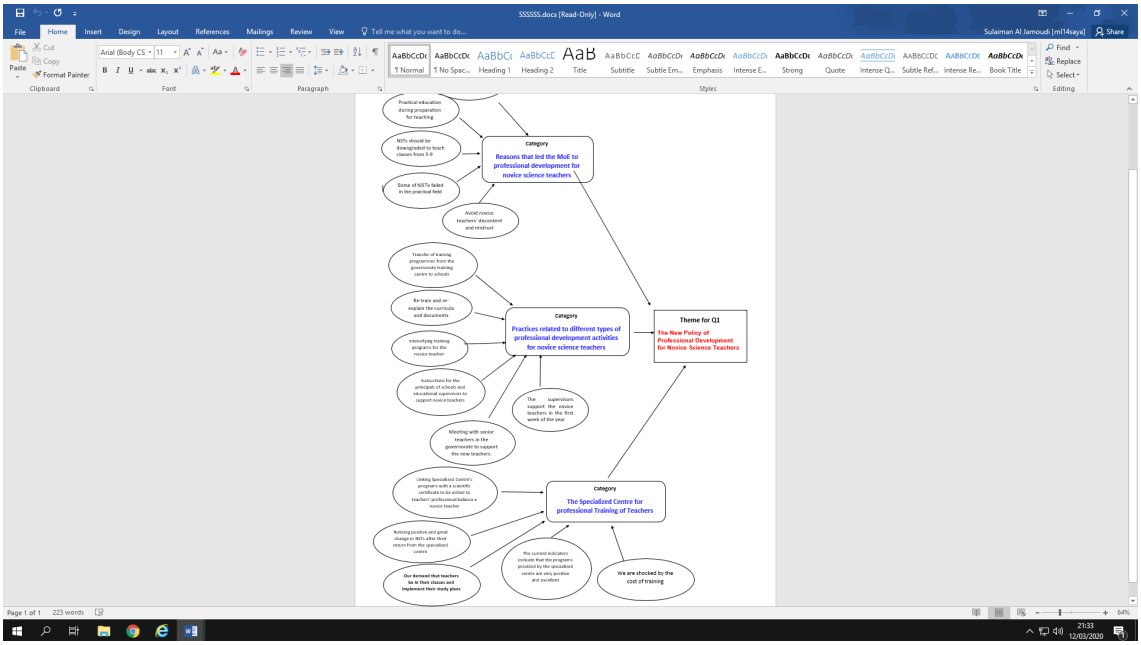


Figure 4.8: Map of a main theme developed from categories (sub-themes) and codes

4.8.2.6 Refining categories, sub-themes and themes

With a view to obtaining a clear perspective on each sub-theme that emerged from the data and the various opinions related to it, I decided to print out all of the quotations from documents and extracts of interview transcripts classified under each sub-topic. This process allowed me to carefully reread all of these quotes under each sub-theme and to select a number of them that were of particular importance to each issue. In addition, it allowed me to see clearly which category of stakeholders mentioned any given issue and what they said about it. I found this process of great benefit, because it provided me with a clear picture of each sub-theme and because it showed me the true value of the data I had collected.

At this point, I started to outline the writing plan for each sub-theme, to be included in the first draft of this thesis. I also selected quotes that would support my analysis and this process allowed me to balance the choice of quotations cited between the three stakeholder groups and the policy documents.

4.8.2.7 Interpreting the findings and writing up

The stage of interpretation can be said to have continued from the beginning of the process of writing up the findings until the completion of all chapters, which required an accurate understanding of the data in order to organize them correctly into themes. It was important to support the findings with clear, representative

examples and quotations from various qualitative sources, taking into account two basic requirements, the first being the need for a balance in quoting from the different stakeholder groups and the second being to achieve a diversity of modes of representation of the data by including as appropriate block quotations, short quotations, paraphrases, percentages and numbers. This stage took a long time because it involved reading the results, writing them up and returning to read the findings and what I had written.

4.8.2.8 The accuracy and trustworthiness of the analysis

Holliday (2007) claims that the definition of each theme begins to form in the mind of the researcher during the data collection stage; therefore, it is natural that his or her interpretation of the data will tend to differ from that of other researchers. Following this principle, I decided not to cooperate with anyone else in order to verify or validate all the operations that I had performed in the thematic analysis of the data, partly because each research has its own unique perspective (that of the particular researcher) and partly because such a verification process would have required considerable time and effort to implement it. I therefore chose to check the accuracy of the analysis myself, according to the recommendation of Bazeley (2013).

I also secured merit by applying the four criteria that Lincoln and Guba (1986) identify as appropriate in assessing research reliability: credibility, transferability, confirmability and dependability. The credibility of the study findings was assured by the use of triangulation and by having a third party review the translation of quotations. In regard to transferability, the comprehensive analysis and reporting of findings in Chapters Five to Seven and their detailed discussion in Chapter Eight enables the reader to assess the extent to which the findings can be transferred to another context. As for the confirmability of the investigation, the presentation of quotations, citing stakeholders, has demonstrated the arguments behind them. Finally, I have met the fourth criterion, dependability, by specifying the time range within which the data were collected and by clarifying the contextual changes during the research process.

4.8.3 The researcher's role

My independent status as a researcher provided the participants with a safe and comfortable environment in which they were able to talk freely and express their opinions on the topic under study. In addition, participants were fully aware of the right to withdraw from the study before data collection began and up to the transcription stage (two months after they had given their consent), without disclosing a reason for doing so. Before starting my scholarship, however, I had worked for the MoE, in the Directorate-General for Human Resources Development, which was responsible for programme planning for all Omani teachers in the various disciplines. I was aware that my role as a Ministry employee on one hand and a researcher on the other, investigating a topic related to MoE policy, might have implications for the study including the potential for a conflict of roles. Merton (1972) distinguishes between members of a particular group (insiders) and those who are not members of that group (outsiders) and considers the effects on the research process of the researcher being an insider or outsider from the point of view of the research participants. My MoE status made me an insider researcher in this study, which conferred some advantages such as in generating relationships with participants in order to facilitate the research procedures (Mercer 2007). However, there were also disadvantages, such as participants and the researcher making assumptions about aspects of the research topic being known or unknown to each other (Mercer 2007).

Therefore, I took a number of steps to minimize as much as possible the formal impact of my insider status on the participants' responses. Firstly, during the interviews with stakeholders, both in the MoE and in the governorates, I highlighted my situation as a researcher and informed the interviewees that I did not currently hold any position in the Ministry. In addition, I assured them that I had joined the scholarship scheme to pursue my higher education and that as such I had no formal obligation to the MoE, an assurance which I hoped might reduce any influence on the participants of their potential perception of me as an insider. Moreover, I took care to keep to myself my perspective on the research and my assumptions regarding the issues raised, in order to avoid any influence on participants. Secondly, I ensured confidentiality by not being present while the NSTs took part in the research by completing the questionnaire survey. Further,

participants were not asked to give their names when completing the questionnaire and an assurance of confidentiality and voluntary participation were highlighted on its first page.

4.8.4 Validity of the questionnaire

Validity means “the extent to which the research instrument measures what it is supposed to measure”. (Neuman 2011, p.208). In this study, content validity was assessed against models of PD reported in the literature (Feiman-Nemser 2001; Taylor 2002; Hustler et al. 2003; Cheong 2005; Al-Lamki 2009). Furthermore, the questionnaire was submitted to a panel of experts holding doctorates in the development of human resources and the philosophy of education, whom I asked to determine the adequacy or inadequacy of the questionnaire items and to delete any items that were not relevant or amend any that were inadequate. Finally, I asked them to identify any aspect of the topic which I had overlooked in preparing the instrument.

4.8.5 Reliability of the questionnaire

The reliability of the scale used in the questionnaire survey was estimated by measuring internal consistency, which was calculated for all scale items by means of Cronbach’s alpha. The resulting alpha value for the overall model was 0.932, while the values for parts 2 and 3 of the questionnaire were 0.921 and 0.915 respectively, which means that the internal reliability of the hypotheses was high, since any value of Cronbach’s alpha over 0.70 is considered to indicate sufficient reliability. When designing the questionnaire, I also adopted some of the strategies to reduce threats to reliability suggested by Cohen, Manion and Morrison (2013), such as maximizing the clarity of items, avoiding the use of words that might create misunderstanding and using both closed and open questions. Finally, I conducted a pilot study with 20 NSTs and four other stakeholders in a different governorate, as reported in Section 4.7.1.

4.8.6 Trustworthiness of the qualitative research

To ensure trustworthiness, I employed the constructs suggested by Guba (1981). One element of trustworthiness is credibility, which I ensured by adopting an appropriate research design based on the use of semi-structured interviews, the

review of policy documents and the inclusion in the questionnaire of some open questions, which elicited deep information and diverse views on the research issue. Second, my familiarity with the culture of the organization helped me to guarantee credibility; thus, my long experience of working in the MoE, for example, helped me to gain easy access to participants and ensure their cooperation. However, Lincoln and Guba (1986) advise the researcher to be aware of the notion of prolonged engagement and its undesirable effects. For this reason, I kept a journal in which I wrote a reflective commentary and reported my feelings in order to maintain objectivity and to avoid any bias in my reflections on the data obtained. “The reflective commentary may also be used to record initial impressions of each data collection session, patterns appearing to emerge in the data collected and themes generated” (Shenton 2004, p.69).

In addition, the interpretation of interview responses, transcripts of documents and the open-ended questionnaire items are not without risk of bias. I therefore took several measures to eliminate this, such as recording all interviews to avoid any change to the responses and supporting all my findings from various sources with quotes. Moreover, in my interaction with the participants, I explained to them the objectives of the study and the nature of my participation in it. Through these procedures I aimed to achieve the confirmability of the data and findings and to avoid bias. Richards (2009, p.160) affirms that trustworthiness can be achieved and bias avoided through the use of “richer representations, with participants’ voices and perspectives emerging clearly”.

Another means of ensuring credibility that I employed is the use of triangulation, which involved the recruiting of a wide range of participants. For example, it took the form of comparing the needs described by some NSTs in Muscat with those who were in a comparable position in the other governorates. The sampling of a range of participants, such as in different governorates, may be employed to provide a diversity of perceived realities based on a wide spectrum of experience (Krefting 1991; Shenton 2004).

4.8.7 Generalizability

The term ‘generalizability’ refers to the possibility of applying some conclusions to a whole group based on information gathered from a “representative sample

of that group" (Denscombe 2002, p.140). Generalizability can alternatively be described as the extent to which the results derived from a particular study may be useful for understanding the situation of another population outside the specific scope of that research (Bryman 2003). As I recruited all available NSTs in six governorates to participate in the present study, the research findings can be applied to this particular group.

Although I have argued that all NSTs in all eleven governorates in Oman receive almost the same professional development provision and support via the same mechanisms, the findings of this study are limited to the six participating governorates. However, while emphasizing the need to pay careful attention to cultural and contextual differences, these findings do offer a broad understanding of the PD of NSTs within Oman in general and in contexts similar to that of Oman, such as in the member countries of the Gulf Cooperation Council and some others in the Middle East with a similar Islamic and cultural context, which is known as 'ecological validity' (Sandberg and Alvesson 2011).

4.10 Ethical considerations

Ethical principles apply to the rights and interests of participants that are to be recognized during the conduct of research (Denscombe 2002). I consider the following ethical principles relevant to the current study: access and acceptance, confidentiality, informed consent, anonymity and avoidance of harm. The following subsections address these in turn.

4.10.1 Access and acceptance

The first ethical principle is that of gaining acceptance and approval from the institution in which the research will be conducted (Cohen, Manion and Morrison 2013). For the current study, in November 2016 I contacted the TOSD, the MoE office responsible for granting such permission before research begins, and was subsequently granted preliminary approval regarding the possibility of research on this subject at the Ministry (see Appendix F). The TOSD asked for more details of the objectives of the research and the data collection methods in order to issue letters to facilitate the access that I would need to conduct the study on Ministry and related premises. In addition, I sent each potential participant an information

sheet about the objectives and data processing methods before they decided whether to participate in the research (see Appendix G).

4.10.2 Confidentiality

The current study discussed some issues related to decision-making at the national level in the MoE. Opinions and attitudes on these issues are very sensitive if disclosed publicly. However, this information was important and necessary to support educational research. I therefore undertook to ensure that the data obtained would be treated as confidential and used only for research purposes and under specific controls.

4.10.3 Informed consent

The guarantee of confidentiality was reflected in informed consent. There was a section at the beginning of the questionnaire informing participants of the objectives of the research, explaining that they were volunteers and as such entitled to refuse to participate or to withdraw from the study at any time. Interview participants were given similar information and assurances before the start of each interview (see Appendix H). A further aspect of informed consent was that I informed participants that the researcher would keep all audio recordings in a safe place, would use them only for the purposes of this research and that they would be erased immediately after the thesis was completed.

4.10.4 Anonymity of participants

Another aspect of the protection of confidentiality was the assurance of anonymity for all participants in the research. All data collected were handled anonymously and respondents were not required to disclose their names. Pseudonyms have been used to identify interviewees where their responses have been quoted in this thesis. In addition, at my request, the MoE provided an office in which I was able to conduct the interviews in privacy and without being disturbed.

4.10.5 Avoidance of harm

Finally, in order to ensure the avoidance of harm, it was necessary to bear in mind that in some cases, participants might reveal opinions which would seem contradictory to the authorities' views. The procedures for conducting the study and obtaining informed consent that were enacted as explained above protected

the participants from any potential misuse of such revelations. I explained to all participants that the data to be obtained would be used exclusively for research purposes, and that nothing which they said or wrote in the course of the research would affect their employment or their wider relationship with the MoE.

Further details of the ethical considerations applicable to this research may be found in the ethical review form reproduced in Appendix I.

4.10.6 Data protection

The protection of data supplied by study participants is an integral part of research ethics. I have adhered to all the criteria set by the University with regard to data at all stages, namely before conducting the study, during the study, during the analysis of data, in the presentation of results and in regard to the storing of the data. All of these procedures are explained in the ethics form, reference AREA 17-001.

The data that I had obtained were stored in a safe and protected location and were transferred to the University's data drive, where they will remain for five years and then be disposed of and destroyed. I have retained anonymous data, which I will use for future research, without individual participants being identified. At the same time, I have ensured that the data protection measures adhere to all of the ethical requirements stipulated by the MoE and by the TOSD and I have undertaken to respect these, which undoubtedly represents a level of protection meeting the expectations of the study participants.

4.11 Summary

This chapter has set out the methodology adopted in the present study and reviewed a number of important issues arising from the methodological choices made. It began by restating the research question, then gave details of the philosophical underpinnings and design of the research, including the methods used to obtain data, the participants in the study, the data analysis procedures followed and the pilot study which preceded the main data gathering operation. It also addressed the need for rigour in the research and the applicable ethical considerations.

This comprehensive picture of the research methodology is followed by three chapters presenting the findings and a detailed analysis of the data, beginning in Chapter Five with findings related to the policy framework.

Chapter 5

Research Findings 1

Professional Development for Novice Science Teachers: the Policy Framework

5.1 Introduction

Before beginning to examine the findings, it should be noted that the fifth, sixth and seventh chapters present the findings of this study in detail with the direct support of quotations from the relevant documents and responses. Table 5.1 explains the system of symbols corresponding to individual respondents which are used to label their quotations.

Table 5.1: Symbols identifying participants

Category of participants	Symbols	Symbol components	Source
Policymakers	ESZ, ESF, HRE, HRS, SCF, SCH, SCT, SCM, SCHm, SCB, CDY, CDS	The first and second letters of the symbol indicate the source. The third letter indicates the participant's pseudonym.	Directorates of the MoE's headquarters SIPTT
Policy implementors	DoSTN, DoHTT, DoSM, DoGA, DoHRY….	The first and second letters of the symbol indicate the governorate. The third letter indicates the job of the participant. The fourth letter indicates the participant's pseudonym.	The six governorates
NSTs	DoTA, MuTN, SqTS, SbTM, MsTB, DhTI……	The first and second letters of the symbol indicate the governorate. T indicates an NST. The fourth letter indicates the NST's pseudonym.	The six governorates

This chapter answers the first research question by presenting the findings concerning the policy framework and the thinking behind the decisions of stakeholders in the Omani Ministry of Education relating to the professional development of novice science teachers. Its main theme of policy on the PD of

NSTs and the sub-themes emerging from the analysis are illustrated with evidence largely in the form of qualitative data elicited by open questions, gathered from official papers or electronic documents or included in the interview responses of policymakers at the Ministry, policy implementers in governorates and novice science teachers.

The aim of this investigation is the analysis of the MoE's policy of developing NSTs and emerging issues related to this policy, such as how novice teachers are conceptualized at the MoE in terms of their contribution, role and position. Also examined are the levels of professional development offered to this group of teachers and the Ministry's reasons for providing a PD programme for NSTs.

5.2 Novice science teachers: concept and role

There is no explicit definition of the term 'novice science teacher' in the MoE documents examined. Indeed, I found no official text explaining the meaning of the concept or anything close to it among Ministry documents, including the annual training plans for teachers at the MoE, other documents on the training and professional development of teachers, or those concerning the appointment of teachers at the Ministry itself or on its website. Nevertheless, a reasonably clear definition of what constitutes a novice science teacher is essential, as without it there could be confusion and a lack of shared understanding among stakeholders regarding the term and the role. Therefore, an understanding of the concept from the perspectives of key policymakers and actors has been derived from interview evidence, in order to avoid ambiguity of interpretation.

The 2018/2019 guide of the SIPTT (MoE 2018a, p. 44) indicates that the MoE provides a one-year training programme for new teachers, but offers no definition. The document gives a detailed description of the programme and its evaluation mechanism, without indicating the requirements for joining it or defining the target group.

As for the governorates' annual plan for the training of teachers, this contains no term relating to novice teachers at all, nor does it include any professional development programmes for novice science teachers among the programmes approved for the implementation of the plan, while the school manual of the PD

unit states that one of the aims of in-school training is “preparing new teachers and providing them with the basic skills without having to wait to enrol them in the training programmes prepared by the governorate or Ministry” (MoE 2016, p.4).

Thus, it was necessary to clarify the meaning that the MoE ascribed to the concept of the novice teacher, by interviewing two groups of stakeholders: policymakers at the central office and policy implementers in the governorates. All of these officials agreed that the term used at the Ministry to denote this category of educators was ‘new teachers’. They explained that each new teacher was expected to be appointed to a teaching role with a full contract, beginning in September of a given year. One of the policymakers at the central office stated: “The concept of the new teacher refers to one who joined the Ministry this year, for example 2018, regardless of their previous experience of teaching before they were recruited” (SCF). However, the policy implementers in the education governorates had a broader view of what constituted a new teacher, as one of them explained:

> *The concept of the novice teacher is not used in the governorate. We use the term ‘new teacher’ instead and we also apply it to any teachers who move from one governorate to another. Moreover, it is also used for those science and maths teachers who move from cycle two schools (Grades 5 to10) to high schools (Grades 11 to 12). (DhGH)*

This broad definition, incorporating teachers who move from one governorate to another or from cycle two to high schools, was justified by a policy implementer from another governorate as follows:

> *This is a two-pronged concept. For instance, some science teachers who are moved from cycle two schools to high schools need training in specialized subjects. That is because in cycle two they were teaching science in general, whereas in grades eleven and twelve there are some specialized subjects, like physics, chemistry and biology, where they need training as new teachers, even if they have five or more years of experience in teaching, especially the practical side, like the experiments. (MsGA)*

Thus a teacher with several years of service above in second-cycle schools is treated as a new teacher when promoted to teaching at a higher level, because of the need to attend a PD programme to obtain the additional skills required in the new role.

As to the period of time during which a teacher is considered to be new, there was a difference between policymakers at the central office and implementers in the governorates. One of the latter (MuGA) asserted that a new teacher is one who has been hired in the current year, while anyone who has taught for more than a year is regarded as experienced. Similarly, SbHRY stated that the concept applies to “a teacher who has just joined the teaching field, until they complete a year”. In contrast, policymakers at the central office, including SDY and HRf, defined a new teacher as including one with two or three years’ experience.

Thus, policymakers and implementers agreed to some extent on the label, but differed on details. Policymakers focused on the length of time since initial appointment, while implementers in the governorates extended the term to include teachers transferred between governorates and those assigned to teach higher-grade classes. It is important to acknowledge these differences of interpretation among stakeholders and to recognise that the terms ‘novice science teacher’ and ‘new teacher’ are not necessarily interchangeable, with the risk of some ambiguity. This uncertainty may be reflected in the role and expected contribution of NSTs from the point of view of policymakers and how they perceive them, and the relationship of this to the importance of providing the PDPs that they need in order to perform their jobs.

The responses of the novice science teachers themselves to the open-ended questionnaire items revealed some important points here. Among the 399 NSTs who answered these open questions, 166 made reference to novices, using a number of different terms. These are listed in Arabic with their English translations in Table 5.2, which shows how many times each term was used.

Table 5.2: Frequency of terms used by novice science teachers to refer to themselves in questionnaire responses

Terms used by NSTs for this category		Frequency
Teacher with little experience	معلمي قليلي الخبرة	9
Early years teacher	معلمي السنوات الأولى	15
Beginning teacher	معلمي البداية	27
First-year teacher	معلم أول سنة	35
New teacher	المعلم الجديد	38
Novice teacher	المعلم المبتدئي	42
Total		166

Table 5.1 reveals that NSTs used six different terms to denote their initial period of employment by the MoE. In addition, most of the science teachers whom I interviewed described the novice phase as ending at the end of their first academic year. It is also clear from the table that the terms used differed both in Arabic and in English, emphasizing the need for a clear understanding at the Ministry of this category of teachers.

The interview responses of 45 NSTs from six education governorates revealed that teachers had a negative perception of their role during their first period of service. They considered themselves to have very low status at school and believed that they were perceived as weak and inexperienced, having very little to offer, needing considerable support and understanding nothing about teaching or education. Nevertheless, they were expected to take at least as many lessons as the experienced teachers and sometimes more, with no choice in which classes they would teach. They also had to do more extracurricular work than their experienced colleagues. One NST said: “We are treated at school as if we were experienced teachers and sometimes we are given more work than the experienced teachers. They should consider us more” (MsTK). Another said:

> *The problem with the school is that they treat us as if we were experienced teachers, and therefore we are shocked because we are being asked to do things every day that we don’t know how to do. You feel that you are behind the other teachers in all the requirements. Sometimes, as a novice, you look at teachers doing things that are required of us and you know nothing about it. They treat me as an experienced teacher, although I am not the only new teacher in the school, and there are new teachers of different subjects. I wish that they would meet with us all to tell us these things. (MuTN)*

A male novice science teacher described his experience:

> *The fact is that there is a general view in our schools, especially the boys' schools, that the new teacher is to be given as much of the timetable as possible. We should get less work. Sometimes some difficult grades are given to the new teachers, or the classes that have a number of badly behaved students or struggling students, and those who require more effort, which are the worst classes in the school. (MsTM)*

The explanation, according to the NST interviewees, was that it was easy for the school community to exploit newcomers:

> *They do not look at you as a new teacher, but on the contrary, sometimes you get more of a heavy timetable than them ... The reason is that they see the new teacher as a newcomer, … who will agree to anything and is not aware of the administrative aspects that might give them the opportunity to refuse or object... They consider them to be more cooperative. (SbTMa)*

Another interviewee said:

> *The fact is because I am a novice, I couldn't discuss this with the school administration, but if I had four or five years of experience, I would have gone and discussed the issue. In the first year you feel that you are a guest at the school and therefore should not discuss these things, so that they don't get certain ideas about you. (MsTM)*

The novice science teachers believed that head teachers did not understand how much they were burdened by their workload, which obstructed their professional development. One of them explained:

> *Because of our high workload, we don't have the time to sit down with the senior teachers and my colleague teachers to learn from them. If we have 21 to 23 classes a week, at a rate of 5 lessons per day, we are under pressure at work because we are the new teachers and we need a lot of time to adjust. The Ministry, the directorate and the school treat us the same as the experienced teachers, as they are now ... This pressure of work makes you not want to leave the school to attend any training programmes, even if you are given the chance, because if you leave the school for training, who will do your work? No one. (SbTN)*

The policymakers, by contrast, asserted that such complaints were unfounded, as beginners were treated equally with other teachers. One policymaker explained the reasons for this: "If we give the novice science teacher a heavy schedule, he will feel that he is a target, and the environment can also affect him and change him from a positive person to a negative person" (SqHT).

The policy implementers in the educational governorates indicated that they did not interfere in the grades or lessons assigned to the novice teachers, because this was the responsibility of the schools.

There is clear evidence here of a deficit, which lies in the inability of headteachers to understand the role of novice science teachers, showing poor understanding and a lack of respect for the professional knowledge and experience of novices. Thus, both policymakers and implementers appear to perceive novice science teachers as very inexperienced, weak and in need of moulding because they are not in a position to make much of a contribution.

In effect, the multiple different terms to denote these teachers are interchangeable in the Omani context and do not involve significant differences of understanding. Similarly, in the Western context, most studies refer to this category as comprising teachers who have completed a university course and have recently started teaching. For the purposes of the present study I propose a procedural definition, using the term ‘novice science teachers’ to mean those who have completed their university studies and joined the Ministry of Education as teachers in September of a given year. However, I prefer to extend the concept to cover their first three academic years as teachers, during which they can be expected to undergo adequate professional development at the three levels of Ministry, governorate and school, within the continuing professional development (CPD) framework. Bearing in mind that most teachers can expect to spend nearly forty years in the profession before retiring, I consider it extremely important to intensify the provision of professional development programmes at this stage.

5.3 The MoE's interest in novice science teachers

The document entitled *Philosophy of Education in the Sultanate of Oman* is the main basis for the formulation of educational policy and is the main reference for the Ministry of Education in its creation of strategic plans and development projects for school education. This philosophy is based on ten main sources and includes 16 principles which interact to form the objectives to be achieved by the education system. One of these principles is “Promote the efficiency of teachers and improve standards in the quality of their preparation and training” (Educouncil 2017, p.25).

In order to implement this principle, which is directly relevant to my research, the Ministry has issued a number of guides, including the *Manual of Professional Development and Academic Qualification Programmes* (MoE 2010), which

indicates that PDPs sponsored by the MoE had achieved the following objectives and outcomes: “to change the role of the teacher from … prompter to … organizer and facilitator of the process of learning and education” and “to raise the level of vocational teachers’ qualifications, provide them with knowledge and skills, to inform them of the educational developments necessary to improve their performance, and to meet the needs imposed by the reality of work and its developments” (MoE 2010, p.17).

The Ministry’s guide to preparing the annual professional development plan for the educational governorates (MoE 2018a) determines the distribution and duration of PD programmes. It specifies that 70% of the programmes allocated to each governorate should be for teachers in their various specializations, while the remainder are distributed among the other categories as follows: educational supervisors 1%, principals and their assistants 7%, technical support staff 7%, administrative staff 13%, trainers 1% and other categories 1%. Thus, the professional development of teachers accounts for more than twice as many programmes as the total for all other staff in each governorate, which suggests that the Ministry attaches very considerable weight to the PD of teachers in general, including novice science teachers.

However, the annual professional development plans that reflect this policy make no reference to programmes for novice teachers in general, nor for NSTs in particular. Furthermore, the annual PDPs for science teachers in six educational governorates, included in the PD plans for the years 2010 to 2018, do not identify a category of novice science teachers in the list of science programmes. The plan refers to many programmes for science teachers, but in the section on target groups, no distinction is made between novice and experienced teachers, or those in any particular cycle. This required further investigation when interviewing policymakers.

The questionnaire for NSTs included three items related to the Ministry’s interest in the professional development of novice science teachers. The first relates to the number of PDPs they had attended between their appointment by the MoE and the conducting of the questionnaire in February 2018. It was found that 51 of the total of 399 NSTs had received no professional development, while 295

others had received between one and four training programmes since their appointment. A further 89 had attended more than four programmes, either at the Ministry's training centre, the training centre in the governorate or at school. More than 25% of all novice teachers had received no training during the first semester, in other words from September 2017 to February 2018, raising many questions which required clarification from policymakers.

Items 9 and 10 of the questionnaire concerned novice science teachers' perceptions of the MoE's interest in their professional development. The data shows that 79 NSTs strongly agreed with item 9, which asserted that there was considerable interest within the ministerial directorates "in developing the teaching skills of novice science teachers". In addition, 229 NSTs agreed that the MoE was interested in developing their skills, which means that 77% of NST respondents felt that the MoE, governorate or school was giving attention to developing their teaching skills.

This result contrasts with the finding mentioned above that more than a quarter of NSTs had not yet attended any training since being appointed. Keeping in mind that 62 respondents selected "neither agree nor disagree", the discrepancy may be attributable to a lack of care in completing the questionnaire or to a reluctance to criticize policymakers and its implementers in governorates for their answer.

Finally 201 NSTs strongly agreed and 46 more agreed with item 10, that the "governorate officials are interested in developing the skills of novice science teachers". Overall, these three pieces of questionnaire data provide evidence of concern among Ministry policymakers with the professional development of this category of teachers, for several reasons. This is discussed further in Section 5.4.

The MoE's interest in the PD of NSTs and the reasons for it were investigated in greater depth in a number of interviews with policymakers, all of whom made it clear that there was strong interest in science teachers, laboratory development and the creation of new global curricula. They also stated that improving the PDPs offered by the Ministry to science teachers was a basic requirement and part of the government's approach. One policymaker said that the MoE's interest in science subjects and its teachers in particular resulted from the Ministry's desire to keep abreast of developments in the fourth industrial revolution.

A policy implementer from one of the governorates confirmed this interest:

> *We ensure the professional development of science teachers just like teachers in all subjects. I personally consider science subjects to have specificity in professional development programmes in that they have different branches. Besides, students from our community find these subjects particularly difficult for cultural reasons, so we always pay more attention to science than to other subjects, in order to produce science teachers with a very strong scientific content. (MsGA)*

In addition, 15 policy implementers addressed this concern from a global perspective, noting that the comparison of educational systems across the world depends on students' TIMSS results. As Oman has achieved below average results in the last four rounds of this competitive exercise, it is seeking to improve its results in future by developing all aspects of science.

As for the views of novice science teachers, 38 of the 45 interviewed said that there was nothing to distinguish them from other teachers. Their argument was that although they were timetabled to teach more lessons each week than colleagues in other subjects and despite the additional workload of a subject with both practical and theoretical aspects, they all received the same salary and the same privileges. The NSTs also said that their training programme was the same as that offered to novice teachers in other disciplines. Thus, no aspect of PD provision distinguished them from their non-scientific counterparts.

5.4 Factors prompting the MoE to provide PD for NSTs

Policymakers and implementers identified a number of factors, both internal to the Ministry and external, i.e. related to other government agencies, affecting the MoE's adoption of a PD policy for NSTs with specific goals and expected results. Some of these factors were set out by an implementer as follows:

> *We are fully aware that teacher preparation institutions are not all at the same level of qualification and training. Some of them follow traditional methods of teaching, which may be different from what is applied in our schools. Another thing is that there are many new educational developments that the teacher should be aware of and they are not taught by these institutions. The fourth aspect is to inform the new teacher about developments in the Omani education system, whether in educational evaluation, education techniques or non-descriptive activities. These are all aspects that are required to give the novice teacher a solid grounding before facing the students. (MuGA)*

5.4.1 Internal factors

Among the internal factors that prompted the Ministry to implement PDPs for NSTs was the introduction in 2017/2018 of the Cambridge Science and Mathematics Series as a new curriculum in the Omani education system, beginning with grades 1-4 before being gradually extended. This change, according to policymakers, included content, teaching methods and assessment tools and therefore required the training and support of science and mathematics teachers to apply the new curriculum mechanisms in their respective fields. It should be noted that the PD provision offered was not limited to novices, but included all teachers of science and mathematics in Oman.

The second factor prompting the MoE to create a new policy for the development of novice teachers in science and other disciplines, according to policymakers and implementers, was that 65% of new teachers were assigned to remote schools, which often lacked PD support such as regular visits by supervisors or the availability of senior or experienced colleagues.

Another factor identified by policymakers and implementers was that of recent developments in knowledge management and behaviour and learning, from a teacher-centred to a student-centred orientation, requiring novice teachers to be provided with appropriate mechanisms and teaching methods. Three policymakers also asserted that Omani students' low achievement in TIMSS had led the Ministry to reconsider PDPs, including an improved focus on enabling NSTs to formulate and develop questions appropriate to all levels of students.

The final factor identified by nine policymakers and implementers in adopting the Ministry's new policy on teacher PD is the results obtained by Omani students in TIMSS and PIRLS. The low scores in mathematics and science of the fourth and eighth grades in the fourth and fifth cycles of 2007 and 2011 compared to their peers elsewhere in the world, especially in the Arab Gulf states, contributed to the Ministry's review of the policy of in-service PDPs provided to teachers in order to ensure the improvement of students' performance in these two international studies. This was done by having SIPPT provide training programmes aimed at diversifying the teaching methods used within the classroom and enabling

science and mathematics teachers, including NSTs, to formulate and develop appropriate questions for students at all levels.

5.4.2 External factors

As to factors external to the Ministry, four-fifths of policy implementers in the governorates spoke of a gap between the pre-service preparation of NSTs and the requirements of their work in the classroom, resulting from poor coordination between the MoE, responsible for the employment of teachers, and the Ministry of Higher Education, which oversees their preparation and remedial training. In particular, some implementers referred to poor training in key components such as teaching methods and the application of assessment tools in some teacher preparation institutions inside and outside Oman, obliging governorates and MoE centres to provide PDPs for NSTs in order to bridge this gap. A strong majority of policy implementers were in favour of a process to retrain teachers. MoE policymakers interviewed did not mention this factor as affecting policy adoption, whereas implementers focused strongly on it, perhaps because of their proximity to teachers' needs and the skills required in the classroom.

Another reason given by policymakers and implementers for the Ministry's adoption of its PD policy for NSTs was that newly qualified teachers often had a long wait, sometimes of several years, between graduation and their employment by the Ministry, during which period they would lose many of the skills and much of the knowledge gained during their preparation. One implementer said:

> *Unfortunately, the time lag between a teacher's graduation from the university or the college and his employment sometimes extends for four years. These years are spent by the teacher without work or work in a field far from the field of education in the private sector, for example, and thus this interval the teacher loses a lot of information and when he joins the work, we find that we need to provide professional development programmes again in the aspects of teaching, such as the application of teaching methods and the use of modern technology and teaching aids. (DOGA)*

Some interviewees also believed the MoE to be influenced by events in other parts of the world, such as reforms which are clearly triggered by international competition. Therefore, concern was expressed as to why some countries were outperforming Oman in the international league tables. Five policymakers hinted

that global competition affected the development of education policy, including on PDPs for teachers.

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A final external factor was identified as the recommendations arising from global organizations such as the OECD and the World Bank and from studies conducted by the Ministry to evaluate the educational system in Oman for grades 1-12, including a study in cooperation with the World Bank in 2010 and another in 2014 conducted jointly with the New Zealand Education Consortium, which recommended the adoption of a more effective PD policy for teaching staff in order to improve professional standards.

These factors can be seen to have combined to cause the Ministry to implement a rigorous policy for the professional development of teachers through the establishment of the SIPTT. The Institute is discussed in Section 5.6, after a detailed examination of the structure of the MoE's PD provision for NSTs.

5.5 The structure of PD provision by the MoE

The data obtained from interviews indicate that the MoE's provision of PD for its novice science teachers has a loose three-part structure, with policy being delivered in different ways from the centre, within the governorates and at school level. Policymakers and implementers agreed that PD was organized at three levels, from the Ministry down to what policymakers described as professional development units in the schools. They also concurred in recognising the lack of an integrated and unified framework with clear roles for each of the three levels of provision, echoing a criticism made in a study by the World Bank:

> *The system of training and human resource development in the MoE is the responsibility of a number of different bodies, and the system lacks a central policy development or policy review mechanism (MoE 2012, p.208).*

The World Bank study also warned of a lack of clarity in the Ministry's policymaking:

> *However, while some policy-making structures are in place, it does not appear that the MoE has a tested, clearly established and well-understood process in which various units can develop coherent educational policies together (MoE 2012, p.208).*

In order that the three levels of provision can be compared, the following subsections analyse the evidence from stakeholder interviews and official documents on PD provision at each level in turn, beginning with the centre.

5.5.1 Ministerial level

This subsection considers the central element of the delivery of policy on NSTs' professional development, presenting an analysis of data gathered from official documents and from interviews with policymakers at the central office and implementers in the governorates. The analysis examines the structure and function of central bodies, the cascading of training, day-release for teachers and the need for a system of licensing teachers professionally.

5.5.1.1 Central bodies concerned with the PD of NSTs at the MoE

The MoE's organizational structure document and its terms of reference issued under Royal Decree No. 37/2008 indicate clear that three ministerial directorates are concerned centrally with the professional development of teachers, including novice science teachers. These bodies are the Directorate of Human Resources Development, the Directorate of Curriculum Development and the Directorate of Educational Evaluation.

Among the functional responsibilities of these directorates related to PD and training is the requirement that the Directorate of Educational Evaluation should "propose training courses for teachers and supervisors in the field of measurement and educational evaluation and participate in their implementation in cooperation with the competent authorities". Similarly, one of the competencies of the Directorate of Curriculum Development is to "participate in determining the training needs of teachers and educational supervisors to raise their professional performance in light of the requirements of implementing the curriculum". The Directorate of Human Resources Development consists of the Department of Educational Supervision, responsible for supervising teachers, and the main

training centre at the Ministry. Its terms of reference include “defining the training needs of teachers and supervisors” and “activating the role of the training centres at the Ministry and the educational governorates”.

During the data collection in January 2018, the responses of officials at the Ministry made it apparent that the MoE had established a specialized PD centre for all categories of teachers and that the training of novice teachers had been transferred in 2016 from the existing Main Training Centre to the new SIPTT. According to the directory of the SIPTT, it focuses on the training of teachers and educators who are proud of their education and are characterized by high skills, self-confidence and motivation (MoE 2018a, p.6). The aims, roles and programmes relating to the SIPTT as a policy initiative in the professional development of novice science teachers are discussed in Section 5.6 of this chapter.

The policymakers responsible for the design of the curriculum explained that novice teachers would be receiving special training courses which in the past had been implemented by HR and were now managed by the SIPTT. These courses should be continuous, but were still very general. The Directorate of Curriculum Development had a limited role in teacher training of novice teachers, which received full attention at the decentralized level of the governorates. Another policymaker from the Directorate explained its role in PD for NSTs:

> *We in the Curriculum Directorate are not responsible for the training courses that the new teachers are getting, or whether they get them or not. We are responsible for feedback from the curriculum as applied, including any scientific mistakes, and the distribution of lessons for the units, and the need for some bulletins to clarify the teaching of some topics. However, training is the responsibility of another authority. (CDY)*

A policymaker from the Directorate of Evaluation added:

> *Although there are three separate bodies at the Ministry, there is some coordination through periodic meetings and workshops, usually through an educational meeting between specialist supervisors and members of the curriculum and assessment teams. These meetings are conducted twice yearly and their aim is to discuss any issues affecting the subject and supervision of the work. (ESZ)*

In contrast, the implementers of PD policy in the governorates complained of weak coordination between the relevant authorities at the Ministry, which

negatively affected implementation in the provinces, as expressed by a provincial training officer:

> *There is no full coordination between the Specialized Institute and the rest of the Ministry's departments, and in fact we have to deal with more than one organization, so we wonder what the role of the main training centre is now that the specialized centre exists. I think if efforts were coordinated, the results would be better. (DhTRM)*

There was wide agreement on this lack of coordination between the MoE and the governorates on the PD of NSTs, with ten policy implementers in the six governorates affirming, in the words of one of them, that "everyone is on a different path".

As to the existence of two parallel training facilities, the policymakers all denied that there was any duplication between them, as the SIPTT delivered long-term training programmes for both new and experienced teachers, while the main training centre at the Ministry was responsible for short programmes to address simple needs related to the annual PD plan for teachers, proposed by the governorates. Furthermore, they explained that the main centre did not offer training programmes for teachers, supervisors and school principals, which were the responsibility of the SIPTT, but focused on the needs of administrative staff in schools. In addition, each of the centres had its own separately funded professional development plan at the Ministry.

However, as one of the policymakers explained, there was a reason for duplication of PDPs at governorate level:

> *There is still a problem. The Specialized Institute does not inform the governorate's supervisors about the development programmes offered to the new and experienced teachers. Therefore, the supervisors cannot follow up the impact of these programmes. When the supervisor is visiting the teacher he just gets to know that the programme offered has already been taken. So, the supervisor does not know the skills that the teacher trained in, and this is because of the bad coordination. (HRE)*

A policy implementer from another governorate concurred:

> *This is because of bad coordination and the lack of a clear strategy for novice teachers from the different authorities. Sometimes there is a kind of contradiction between the two courses. There must be a clear strategy and coordination between all of the authorities. (HRF)*

There is thus clear evidence of poor coordination among the four bodies concerned with professional development at the MoE and in the governorates, which may be explained by the fact that four years after the establishment of the SIPTT, there are no administrative bodies at governorate level directly responsible for implementing and following up its work.

5.5.1.2 Cascading training

Professional development documents at the MoE indicate that the central authorities operate a cascade model of in-service training, whereby teacher trainers from each governorate are themselves trained centrally before returning to their governorates to replicate the training programmes with all teachers (MoE 2001; MOE. 2014b). A curriculum administrator reported that the mechanism of training had changed recently, with the introduction of science and maths sequences:

> *Our training philosophy has recently changed with the new curriculum. Before, we used to take a number of supervisors from each governorate and train them centrally. Those supervisors would then train the senior teachers in their governorates and the senior teachers would train the other teachers in the schools. However, we ended up with high losses in training materials and training hours. Now, we train all the supervisors in the governorates centrally, then they train the other teachers in their governorates. (CDY)*

Another respondent added:

> *In the new curriculum, I admit that we do not aim to train teachers or novice teachers in particular. The central training at the Ministry on the new curriculum is done by training a sample of the senior teachers and supervisors. (CDS)*

Five policymakers criticized the quality and consistency of the current policy of the central authorities on the professional development of teachers, alleging that it had changed for the worse. One offered this clarification:

> *A few years ago, a wide range of training was available, which meant that teachers benefited the most from the training. Nowadays, however, I notice that the training is provided by the central bodies for supervisors and senior teachers only, then they give the other teachers their feedback. I believe that there is a big gap between the previous and the current situation. This new strategy is not so beneficial for the teachers. (ESA)*

Another respondent added:

> *There is some uncertainty in the Ministry's policies in the training field. For instance, our section was in charge of setting up and developing the continuous evaluation tools for science, and making sure that the teachers understood how*

> *to use the tools and their implementation mechanisms in a better way. We visited 11 governorates and trained the supervisors and senior teachers properly, so I am not sure why this strategy has been stopped by the Ministry. (ESF)*

A third interviewee (ESZ) suggested that "the problem of central training lies in the loss of follow-up of the effect of this training on the practice of those who have trained them".

As to the implementers in the governorates, their views on the central training and its mechanisms differed markedly. Most of them called for the transfer of full PD programmes to the governorates and for the provision of support and personnel for the provincial training centres, while others expressed a preference for central training because it was characterized by the quality of materials and trainers. The director general of one of the governorates defended the former position:

> *I suggest transferring the central training programmes to the governorates in order to avoid any training losses and the high number of absentee new teachers who don't attend the training, especially females, because of family commitments. The governorates should be given a chance ... Yes, the governorates have the ability to implement the new teacher programmes through the central support of the Ministry, as the numbers of new teachers are increasing annually and the Ministry cannot meet the requirements of this programme in the long term. It can conduct the training only by transferring it to the governorates. Moreover, it is easier for the governorates to link the theoretical side to the practical side during the training of new teachers. (DHGH)*

Another general manager justified his preference for the central training alternative as follows:

> *We prefer central training. For example, The Specialized Institute for Professional Training of Teachers had trainers with higher academic qualifications, more practical experience, and were selected carefully to achieve quality goals. They have better characteristics than those who are in the governorates. They are in continuous contact with Omani universities and are better at building bridges. The specialized centre also has the potential in the training environment which is not available in the governorate training centres. The Institute also sets plans for all the governorates of the Sultanate by virtue of the studies and research available there, while each governorate makes plans only for its own teachers. In addition, when a teacher leaves his governorate for a different wider environment, this will motivate the teacher and help him build relationships with his peers across the Sultanate and thus satisfy him. (SbGH)*

There was some support among interviewees for such criticisms of the weakness of the PD services offered by provincial training centres, in terms of human resources, material and equipment. An official of the SIPTT reported that the MoE

had no clear plan as yet to transfer its PDPs to the governorates because of the weak infrastructure of their training centres.

As for the NSTs themselves, only five of the 45 interviewed said that they would prefer central training and travelling to the capital city for PD courses, while the remainder rejected this mechanism, preferring to be trained at school or in their governorates. This is discussed further in Section 5.6 on the SIPTT.

5.5.1.3 Teacher release for training

The training offered to NSTs and other teachers at the MoE's main centre was carried out during service and during school hours, a procedure which continued with the inauguration of the SIPTT, novice teachers being released from school during the implementation of training programmes, which might mean taking five working days for each programme and a total of around 20 days. In addition, all novice science teachers entering the induction programme are released for one full day per week for one year, in order to complete assignments as a condition for passing the programme, as an SIPTT trainer explained:

> *Those who enrol in the novice teacher programmes are given day release once a week. On this day the teacher begins to plan and think of applying the required work in the classes. This helps the novice teacher to use the day in the most effective and efficient way for the development and improvement of their performance. Accordingly, after the completion of each stage of the programme, we explain the required work to the novice teachers and provide instructions on how to make the most of their day release time (SCM).*

The above response indicates that the SIPTT would grant periods of day release for participation in NST programmes, whether at the MoE training centre or the governorate to fulfil the requirements of the induction programme.

A strong majority of NSTs interviewed spoke against the policy of releasing teachers for training on teaching days, explaining that their students would lose class time which would not normally be made up, while the novice teachers who attended the training would accumulate a deficit of lesson time which they were expected to make up when they returned to school. It is important to understand that their lessons would not be covered while they were absent for training, so their students would simply not come in for lessons until the teacher returned after training, to take the lessons at a later date.

Similarly, two-thirds of NSTs who responded to the open-ended questionnaire items complained that the PDPs offered to novices were inappropriately scheduled during school time, causing students to miss a number of lessons. Although MoE documents indicate that Omani school students have less instructional time than recommended by international standards, the Ministry does not consider teachers' training day release to be a contributory factor (MoE 2011, p.95). The study found that the MoE was continuing to apply this policy to encourage NSTs to attend PD programmes.

5.5.1.4 The introduction of a professional teaching licence

The MoE documents examined indicate that at the time of the study there was no professional licence to practice teaching in Oman, but that a project was underway to introduce such a licence. The appointment of teachers is currently centralized and subject to the same employment law as that of employees in other sectors of the national economy. Since 2005, the Ministry has set a number of criteria for competition between applicants for a teaching position, the most prominent being to pass a written test designed by the MoE in collaboration with Sultan Qaboos University (MoE 2014). Candidates who pass this test are assigned directly to a full teaching post, without any requirements such as a mandatory induction year or attendance at a training programme.

According to the MoE (2012), its HR Directorate does nevertheless provide a range of short in-service programmes for novice science teachers, at central, regional and school level, following a cascade training approach. Teachers are not paid to attend training, but transport, meals and accommodation are provided for those who wish to take these options. There appears to be no systematic data on the impact of the programmes on classroom practice and study participants expressed some concern that novice teachers do not always take these courses seriously, because they have no implications for salary or promotion.

The number of teachers employed by the Ministry of Education has increased by 40 per cent over the past ten years. This rapid increase means that by international standards, the teaching workforce in Oman has a high proportion of young people with limited experience. For that reason, the Ministry has developed a strategy for selecting teachers and ensuring a better qualified faculty, with two

main elements: the establishment of the SIPTT, to deliver CPD for teachers of all categories, and the drafting of a legal framework for the professional and academic standards to be met by applicants to the teaching profession (MoE 2014). Implementation of the strategy involved the creation within the MoE of a professional licence project office.

When asked to comment on the MoE's motivation for the introduction of the licence, more than half of policymakers and regional implementers referred to the importance of such a licence and linked it to the design of PDPs for novice science teachers. One of the policymakers explained:

> *The main reason that the Ministry calls for the adoption of the professional licence is to find a unified framework for the Ministry in the grade system and to improve teaching standards, so that the novice teacher, after so many years, will become an experienced teacher and then a senior teacher, and therefore must have specific training programmes with training hours linked to specific competencies and skills, in order for the teacher to move from one stage to another. This is a global trend in many countries. The Ministry currently wants to formalise this process to introduce the professional licence. (CDY)*

Another policymaker gave this account of the MoE's aims in introducing the professional licence:

> *As far as I know, the aim of the Ministry is for new teachers not to be assigned to a full appointment as is currently done, because the current recruitment system does not allow the teacher to be properly assessed before being permanently employed or for their contract to be terminated if they do not achieve the required level of performance. Thus, immediately after the recruitment decision, from the first month he becomes part of the staff at the Ministry. Instead, we propose the idea of an initial probationary period for the novice teacher to seek the professional licence, over a maximum of two years, and then he becomes part of the staff at the Ministry... This approach allows the Ministry to ensure the quality and ability of the teacher before full recruitment to the teaching profession. I also suggest that this licence is time-limited, so it's only valid for a maximum of four years, so you can ensure that the teacher will continue to be active and effective in keeping up with the latest developments in education. The aim of all these procedures is to select the best candidates to join the teaching profession on the one hand, and on the other hand, to improve the educational service provided to students and raise the internal efficiency of the educational system. (SCH)*

The above data indicate the desire of policymakers at the MoE to achieve a unified system to raise the standard of science teaching by means of a professional licence system. Provincial policy implementers shared this vision, as the following interview excerpts show:

> *As far as I know, this project is not yet completed at the Ministry ... There is an office working on it at the Ministry and has several points of view ... I am of the*

> *opinion that the teacher, during the first two years of teaching, must join the programme for two years and pass it, to qualify for the professional licence. However, the licence must be linked to something motivational, such as a bonus or a promotion, so that teachers have to compete to pass the programme. They should not think that they have already been hired and therefore there is no need to compete. (MsGA)*

A policy implementer from another governorate described the prospect of the licence being introduced as "a dream which we should strive to achieve in reality":

> *However, it's a matter of education law, related to bringing in regulations that determine aspects of accounting and accountability. Therefore, the expected licencing process will assess the work of the teacher over two years and will determine whether he remains in the teaching profession or is transferred to an administrative function or whether his service in the field of education is terminated. We are looking forward to having a clear promotion system and this would depend on having to do a certain number of hours of training before being promoted from the lowest level positions. (MuGA)*

While there was wide agreement on the desirability of a licensing system, many policymakers and implementers referred to a major obstacle to its introduction, namely that the MoE operates under the umbrella of the Omani civil service, which does not allow it to issue professional teaching licences.

5.5.2 Governorate level

The organizational structure of the Ministry of Education incorporates eleven educational governorates in Oman, which differ in their geographical characteristics and in the number of schools and teachers, but which are alike in being required to implement the policies decided centrally by the MoE's various directorates (MoE 2012). Studies of the Omani education system describe it as more centralized than many other countries, with teacher recruitment, curriculum development, construction of school buildings and the setting of budgets all being decided centrally (MoE 2012; 2107; see Chapter 2, Section 2.2).

The guide to preparing the annual professional development plan for the educational governorates (MoE 2018a) refers to the central directorates determining the number of training programmes allowed for each governorate, in each subject, in accordance with MoE regulations. It also indicates that once a governorate has designed its training programmes, they are sent to the Directorate General for Human Resources Development for technical and financial review, then to the Undersecretary for approval, before being

implemented by the governorate (MoE 2018a, p.9). This ensures that policy on the PD of teachers in general and of NSTs in particular is fully consistent with the centrally decided policy governing all aspects of educational work.

A recent document indicates that the annual professional development plan for the governorates was approved by the competent department of the Ministry, in terms of both the content of the programmes and the costs of implementation. It also shows that the governorates have no independent budgets for PDPs, whether for NSTs or for other teachers (MoE 2012).

The following subsections analyse successively the interview data on three routes by which PD content is delivered to NSTs at governorate level: attendance at provincial training centres, school visits by educational supervisors and the issuing of educational bulletins.

5.5.2.1 Training centres

Royal Decree No. 37/2008 on the organizational structure of the educational governorates stipulates that each shall have its own training centre, tasked with identifying "the training needs of employees in cooperation with other concerned parties", with "preparing the annual professional development plan for the Directorate in accordance with training needs", with implementing this "in coordination with departments and sections of the Directorate" and finally, with its evaluation.

This makes it clear that these centres were created for the PD of all employees in the governorate, whether teachers or administrative and technical staff. It is also clear that the provincial centres should prepare a PD plan for all employees in the governorate and implement it in collaboration with the appropriate departments of the Directorate, without reference to the central authorities of the MoE. Policy implementers in all six governorates confirmed that this conflicts with the instructions in the guide cited above (MoE 2018a), whereby each governorate's training plans must undergo financial and technical review at the MoE.

In my view, this illustrates the contradiction between written policy and its actual implementation. Despite the existence in all of the educational districts of training

centres, technical staff and other support, the PD of NSTs remains under the centralized control of the Ministry, a policy explained by one of the policymakers:

> *Currently, we as a specialized centre still do not think we should transfer the entire new teacher programme to the governorates, because there are some challenges in the governorates, and our goal is to ensure the maximum benefit of teachers, by training all teachers in the Sultanate of Oman to the same level. (SCB)*

There was support for this policy from some provincial implementers, as justified by the Director-General of one governorate:

> *We prefer central training, because the Specialized Institute for Professional Training of Teachers has trainers with higher academic qualifications, more practical experience and were selected carefully to achieve quality goals. They have better characteristics than those who are in the governorates. (SbGH)*

A fellow Director-General made a similar point:

> *I believe that the foundation programmes, such as the novice teachers' programme, should be central, as it will allow the trainees the opportunity to experience more, because the trainers are more efficient. (SqGS)*

This policy and the comments on it call into question the ability of the provincial training centres to provide separate PDPs for NSTs, given the material and human resources available to them. Doubt also arises concerning the extent to which the Ministry has sought to enable regional training centres to play this role in PD provision by supporting a gradual shift from the centre to the governorates and schools, in the light of an evaluation study which found that these peripheral training facilities were hampered by inadequate computer equipment, poor internet connectivity and a lack of technical and administrative expertise (Ministry of Education 2010c, p.20).

5.5.2.2 Supervisory visits

Supervision is considered one of the most important pillars of the education system in Oman, where each governorate has educational supervisors in all subjects. The statistics for 2017/2018 indicate the presence of 1,705 MoE supervisors, amounting to one for every 30 teachers (MoE 2018b). An essential role of these supervisors is to provide professional development programmes for teachers, including NSTs, inside and outside the schools.

The most important and prominent of the 12 methods which supervisors use to support the PD of teachers in schools is the classroom visit, defined as "an

organized process by the supervisor in the follow-up to the interaction between the teacher and his students in the learning situation, in order to analyse the learning situation, which leads to providing the teacher with feedback in order to improve aspects of his performance" (MoE 2013, p.46). During such visits, supervisors evaluate teachers' classroom performance using a form devised by the MoE. In the case of NSTs, a science supervisor will visit schools employing them four times in their first academic year, in order to offer them the support that they need (MoE 2012). The Ministry's policy on school supervision was explained by a policymaker as follows:

> *There is an educational supervisor for each subject at the level of the governorates in Oman, and their responsibility is to follow up and ensure all the elements of the educational system. They have a great burden in terms of the application of the curriculum and ensuring that books, manuals, teaching documents, teaching aids and other things are available to teachers and the schools, as well as ensuring the existence of the assessment document and its effective application in the classroom. Therefore, the supervisor has a prominent role…, especially as the educational system in Oman depends on the structure of supervision for all disciplines, and this is a unique feature of our system. (ESZ)*

Another policymaker focused on the purpose of the classroom visit:

> *It is assumed that the supervisor's goal in the first three visits is not to do a formal evaluation, but to reassure the novice teacher that he is there to support and guide him. The novice teacher will not feel that the supervisor has come just in order to complete the evaluation form. So if we find that this type of compatibility and reassurance instils confidence between the novice teacher and supervisor, this will have a significant positive impact on the teacher's professional development. (HRF)*

These two interview responses illustrate the importance that policymakers at the MoE attributed to supervision in the PD of teachers in general and novice science teachers in particular, as evidenced by the total number of supervisors in Oman and their presence in each governorate for all subjects. An official of the SIPTT reported that supervisors were supported in this vital role by the provision of training programmes specially designed to ensure that they were able to correctly fulfil their duties in support of NSTs.

5.5.2.3 Educational bulletins

The third tool available at governorate level to support the development of novice teachers of science is the educational bulletin, defined as "a written communication … through which the supervisor can convey to teachers the

summary of his readings, suggestions, and observations within a reasonable amount of time and effort" (MoE 2008).

The purposes of the educational bulletin are to share experiences of teaching, which has proved successful in helping teachers to cope with the reality of their work, to standardize the practices of teachers and enrich their knowledge, to inform them of the latest ideas and methods in teaching, and to provide them with the names of sources and references to help them develop their scientific material (MoE 2013). These bulletins are not issued by supervisors alone; policymakers confirmed that the Ministry issues educational bulletins at the beginning of each academic year, in order to clarify the study plan for each subject. As well as being issued in connection with assessment and with updates of educational work, bulletins are sent to school administrations for distribution to all teachers, including NSTs. A policymaker (CDY) also referred to an instruction manual that the Ministry has designed to inform novice teachers of everything they should be aware of in their first year.

However, the vast majority of novice science teachers interviewed asserted that they had not received any bulletins related to teaching their subject or explaining how to apply the continuous formative assessment tools in science. It appears that because such bulletins were not sent to them directly but via the school administration, they were sometimes not aware of them. It should also be noted that the instruction manual mentioned by the policymaker and referred to above was a guide for novice teachers printed in the academic year 2011/2012 and not reprinted since, according to three policy implementers at governorate level. These apparent failures of the simple mechanisms by which those responsible at the MoE and in the governorates were intended to deliver essential information to NSTs are particularly blatant in the light of the modern technology available to the authorities and the fact that each teacher has an official MoE email address.

5.5.3 School level

In 2003, the MoE adopted a policy of treating schools as professional development units, in order to expand the powers granted to them within the education system. The introduction of this policy, involving the provision of PDPs for teachers and other staff, subject to specified mechanisms and controls,

coincided with a number of other educational reforms such as a performance evaluation project whereby school staff assess their own teaching and school management processes, according to specific procedures that they have trained in. The policy also coincided with the appointment of senior teachers for each subject taught by four or more teachers in any school, aiming to develop and support teachers' effectiveness in the classroom. In addition, the Ministry allocated a sum of money to each school to implement PDPs, following a system of educational indicators based on the implementation of tools to assess the performance of the school on one hand and to support the role of senior teachers on the other. In 2006, these three projects were merged under the umbrella of the School Performance Development System (MoE 2009; 2016).

The following subsections analyse the documentary and interview data on the delivery of PD provision for NSTs in schools by principals, senior teachers and colleagues, at weekly meetings and on professional development days.

5.5.3.1 School principals

The *Omani Education System Development Document* identifies school principals as a key element in delivering PD programmes for teachers and other school staff. In addition to administrative and technical roles, school principals are expected to offer PDPs for all teachers, including NSTs. To support them in this role, the authorities have developed tools such as surveys, forms and an electronic system of educational indicators to help principals to identify needs and design training programmes. The system also requires principals to visit classrooms during some lessons, in order to evaluate the performance of the teachers and then to provide appropriate support.

Policymakers described the principal as playing an important role in supervising novice teachers in his capacity as resident school supervisor:

> *School principals … should be aware that they have novice science teachers, who need to have access to various things before starting to teach, such as textbooks, teacher's guides, preparation books and the new guidelines for the teaching of the subject, whether in terms of curricula or teaching methods. These are matters that every school principal must be familiar with. (ESF)*

A second policymaker argued that the difference in scientific background between the principal and the novice science teacher does not exempt the principal from performing a technical role in providing the required support.

> *The technical role of the school principal at school level, with respect to the novice teacher, is not solely at the level of the subject content, because the principal may have a background in human science, while the novice teacher has a degree in physics, for example, so the principal cannot help with detailed content. The input we seek from the principal is in terms of general basics, such as the teaching methods and mechanisms of dealing with students and getting their attention. There are many basics that the principal has in his teaching experience which do not differ from one subject to another, and he must follow this up with the new teacher, and support him. (ESZ)*

Another policymaker explained the mechanisms the school principal should follow with regard to introducing PDPs for novice science teachers:

> *The job of the school principal is to monitor the rate of assessments given to new science teachers and other new teachers, through the classroom observation forms implemented by the educational supervisor of the material, or the senior teacher or school administration. Thus, if the beginner gets a score of 2 out of 5 in any skill on more than one assessment, professional development should be carried out on this aspect, either via feedback in a discussion or exchange visit, or even a training programme. (HRM)*

It appears from the above that the principal has an important role in managing, organizing and delivering PD to NSTs at school level, according to the Ministry's documents and the reports of policymakers. However, the reality was very different according to ten policy implementers in the governorates, who stated that the appointment of a senior teacher in each subject, without clarification of their tasks with respect to professionally supporting and developing teachers, led to the principals leaving this work to the senior teachers, whom they saw as better qualified for the role because they would share the specialization of the teachers concerned.

5.5.3.2 Senior teachers

The appointment of senior teachers can be seen as one of the most important educational reforms in Oman. Since the introduction of the basic education system in Cycle One schools in 1998/99, senior teachers have played a major role in empowering their fellow subject teachers in the fields of curriculum, assessment and teaching methods (MoE 2007).

The senior teacher represents the fourth level of educational supervision levels at the Ministry, administratively following the school principal, and is technically associated with the supervisor of the material, serving as the resident supervisor for a particular subject in his or her school. The Department of Educational Supervision (MoE 2016) lists 35 tasks for which senior teachers are responsible, including the following: preparing a plan to improve the performance of teachers in the subject according to their needs, planning and holding short in-school workshops for teachers, following up the impact of the training on teachers, holding meetings with teachers to exchange views and inform them about educational developments, developing a plan for teacher visits within the school, preparing a programme of exchange visits between schools and training teachers to analyse the results of their students' tests. Each senior teacher has to deliver only eight classes per week, thus allowing enough time for them to fulfil these responsibilities (MoE 2017).

Policymakers emphasized the importance of the senior teacher's role:

> *Senior teachers have a major role as resident supervisors in their schools. They are chosen from teachers with experience in teaching the material, as well as experience in the training mechanism. It's not enough to be able to teach, but they should have other advantages, such as the ability to train and supervise their fellow teachers. (ESZ)*

Another policymaker explained the relationship between the senior teacher and the professional development mechanism for novice science teachers:

> *At the beginning of the year the Ministry sends starters to all governorates. One element of managing these starters is the practical and supervisory approach, particularly the role of the senior teacher in supervising novice teachers. The senior teacher exists in the school and this approach relates to him directly. Therefore, the role of the supervisors is to follow up the senior teachers' plans in supporting the new or novice teachers. (HRM)*

While acknowledging the importance of their role, however, policymakers and implementers noted several challenges related to the work of senior teachers. First, the inadequate financial support that the Ministry received from the government for the recruitment of NSTs left it unable to recruit new teachers in many schools, so it had to raise the number of weekly lessons delivered by senior teachers from eight to twelve. Financial restraints also made it difficult to recruit

suitably qualified senior science teachers and train them to fulfil their role in the professional development of their fellow teachers.

5.5.3.3 School colleagues

An important indirect source of professional development for novice science teachers is via their colleagues at school, whether these are teachers of science or of other subjects. Ministerial and gubernatorial documents do not refer to this source at all, which indicates the apparent reliance of the educational system on a top-down system that takes little or no account of indirect of informal approaches to PD. This raises an important issue in the PD of NSTs relating to professional learning communities and communities of practice, which are discussed in Chapter Eight.

The role of colleagues is also affected by the way in which the Ministry allocates teaching posts to novice teachers. Priority is given to teachers who live in the governorate in which a particular school is located, but if there are no local candidates, which is most likely to be the case for schools in remote areas, it is necessary to appoint teachers from other governorates within Oman or from other countries. Such appointees are prone to seeking transfer to more attractive posts in urban areas, with the consequence that remote schools tend to have a high annual turnover of teachers, not only in science but in most other subjects, thus reducing the availability of informal peer mentors.

5.5.3.4 Weekly subject meetings

The MoE's in-service PD programmes for NSTs and other teachers, whether delivered at the Ministry's training centre or at provincial centres, are carried out during school hours, which requires attendees to be released from scheduled teaching duties, as explained in Section 5.5.1.3. Policymakers and implementers justified this policy by reference to the fact that some schools may be as far as 200 kilometres from the training centre concerned. However, the situation is different for in-school PDPs, where the MoE directs principals to allocate a weekly timetable slot for each subject during which all teachers of that subject are released from classroom duties to attend a meeting as part of the programme, or to discuss matters relevant to their subject, such as the curriculum, assessment and teaching methods.

All policymakers agreed on the importance of these weekly subject meetings, during which the principal and senior teachers can discuss issues relating to the subject with science teachers, including NSTs.

5.5.3.5 Professional development days

The final mechanism of PD for NSTs at school level is the MoE's requirement for schools to hold professional development days, usually at the beginning of each semester, as a formal element of the schedule for each academic year. This enactment of the policy decision to treat schools as professional development units aims to deliver or strengthen certain teaching skills and to inform teachers of educational developments in their particular subjects. One policymaker explained the scheduling of schools' implementation of PDPs for novice teachers.

> *In fact, there are two aspects of professional development for novice teachers in schools. The first aspect is the ministerial decision which determines working days and vacations. There are two weeks, the first week in semester one and the second week in semester two, which means ten days every year, during which the school can cover a large part of the professional development of the teachers, whether general or specific competencies for each subject. The second aspect is called the subject lesson, or two lessons for each subject every week. (CDY)*

Another policymaker added his thoughts on the scheduling of in-school PD during the school year:

> *The best period to train novice teachers is the first week of the school year, before the students begin. During this week they are free and have no duties. Thus, no need to waste teaching time by training them during the semester, which is mentioned in the ministerial decision. (HRM)*

However, 85% of participating NSTs reported that in their schools, these days were not in fact given over to the PD work to which they were allocated, being used instead for administrative processes and preparation for the academic year.

5.6 The Specialized Institute for Professional Training of Teachers

As explained in Section 5.4, the MoE recently established the SIPTT as an independent directorate directly responsible to the Minister of Education for the PD of teachers. The Institute aims to bring to fruition the vision set out in a speech by the Minister on the occasion of its opening, which focused on the following issues:

a) Teachers are one of the most influential factors in the quality of educational outputs; therefore, the Ministry has been keen to develop them professionally and to enrich them with training programmes consistent with the requirements of the profession for 21st-century skills and competencies, in line with the educational policies of the Sultanate. b) The establishment of the Institute was decreed by His Majesty Sultan Qaboos on the recommendation of the Council of Ministers. c) This policy decision is a vital element of the Ministry's future vision for the development of the education system related to the rehabilitation and training of teaching staff. d) The SIPTT is an educational resource equipping teachers with the latest teaching methods, so that they can in turn imbue students with the higher thinking skills they will need in the search for knowledge, with the ability to innovate and with creativity, enabling them to compete in diverse fields of knowledge, both locally and internationally (MoE 2014).

Two major reflections arise from this summary of the Minister's speech: that the policy of establishing the SIPTT was taken at the highest level of the State, which is of great importance for the Institute and its work, and that its strategic objective serves the intention of policymakers to develop the teaching of teachers so that Omani students are better able to compete on the global stage, across the spectrum of learning (MoE 2017).

The specific objectives of the SIPTT, stated on its website on the MoE portal, include developing the methodological quality of classroom teaching, ensuring that teachers contribute to change and development in the learning process and building PLCs in all schools and at all educational levels, to foster discussion and new thinking about development projects.

In order to achieve these objectives, the MoE has rented premises in which the Institute is to provide nine strategic programmes, including the Omani Novice Teachers' Programme. Approximately 75 Omani trainers have themselves been trained to deliver strategic training programmes to teachers, with the continued support of international training centres. The novice teachers' programme is aimed at those enrolled in a teaching position at the beginning of September of each year. It is an integrated training programme, delivered in their first year, comprising four training periods of five days per period. The first period addresses

the best international educational practices and explores how to apply active learning strategies to suit the Omani classroom environment. The second covers investigative learning, where the focus is on higher-order thinking skills, planning to take individual differences into account, creating stimulating learning environments and employing smartphone technology within the classroom. The third period focuses on subject-relevant skills and cooperation with participants from the same specialty to analyse the effectiveness of the application of active learning methods in the various subjects. In the final period, the focus is on the understanding of students in the classroom, addressing different strategies for evaluating learning and the application of 21st-century skills (MoE 2018a).

The three main methods of training used in the Novice Teachers' Programme are direct face-to-face training, e-learning and learning in the work environment. In the first of these, NSTs attend the Institute in Muscat for 20 days over four training periods, receiving direct training with a focus on the development of their skills and attitudes using the most effective international learning methods, including the experience of modern teaching methods and types of assessment, both standards-based and formative or assessment for learning.

E-learning involves NSTs receiving remote training focused on knowledge and concepts, via an online learning platform which supports collaboration among participants. The SIPTT's e-learning platform is also one of the most effective means of communication between NSTs and their instructors during training periods. Each trainee is provided with a laptop and an internet SIM card, and allocated a username and password for them to access the platform and to perform the tasks required of them by the various training activities. The platform provides a learning environment that includes learning forums for training modules, in which trainees discuss a particular activity.

NSTs complete their work in the programme through learning in the work environment, focusing on practical applications through training in the use of new methodologies, assessing their impact, adapting instructional methods to the local environment, procedural research, sharing educational practices with colleagues and engaging in collaborative professional development with them.

NSTs are allocated tasks to perform in the work environment at the end of each training period, in order to evaluate and provide feedback.

When questioned about the new policy for the professional development of teachers in general and NSTs in particular that has been outlined here, most policymakers and implementers appeared to see what the MoE is currently doing through the SIPTT as marking a substantial improvement in its PD services, expressing the belief that if this policy was sustained and overcame the challenges it faces, the objectives set out above would be effectively achieved. However, the majority of policy implementers in the educational governorates and officials in the MoE's various general directorates also complained of uncertainty regarding the policy pursued by the Institute, in the absence of a documented policy framework, and called for greater clarity as to the roles of implementers in the governorates, in order to ensure the achievement of the objectives of the Institute as a new MoE policy.

Ten policy implementers in the governorates and some 23 NSTs claimed that the MoE issued no explanatory documents related to the objectives of projects or the procedures for implementing them, or that if it did so, they were sent only to the directors of governorates, with the result that implementers and teachers received only verbal or brief written instructions.

This finding is consistent with that of a joint study by the MoE and the New Zealand Education Consortium, which said of the preparation of educational policies in the Sultanate of Oman:

> *The links between policy and operational policy at the MoE are not clear. The operational policy is not contained within existing documents; however, there does not appear to be a clear process for the production of operational policy as a result of new policy initiatives (MoE 2017, p.63).*

Similarly, the World Bank earlier stated the following:

> *Oman's Ministry of Education does not seem to have a codified, clear-cut and understandable practice, where its units can prepare logically coherent operational policies (MoE 2012, p.205).*

Five years after the implementation of the new policy, the Oman Education System Assessment Study, conducted by the Ministry of Education and the Education Association of New Zealand, also emphasized the lack of clarity of

policy and procedures, with poor communication and coordination between the MoE headquarters and the governorates; it made the following points reflecting the status of policy development in the Ministry (MoE 2017, p.51):

- No standardized or documented procedures for how policy initiatives are to be presented in the MoE.
- No documented procedures for the assessment of submitted policy initiatives.
- Policy development occurred that was repetitious or overlapping with concurrent policy development.
- There were limited opportunities for aligning and prioritizing key policy developments.

Two policymakers attributed the lack of clarity of the policy on PDPs provided by the SIPTT, including the points above, to the fact that the programmes were designed by experts from outside the Sultanate who had insufficient knowledge of the specific training needs of Omani teachers. This result is consistent with the assertion of thirteen NSTs that the junior science teachers' programme included subjects and skills unrelated to their majors. Five NSTs also affirmed that some skills provided by the programme were related to modern teaching methods that were not appropriate for the age groups which they taught. This result leads to the conclusions that any professional development policy must meet the actual needs of the target group, that the policy in question here must take into account the Omani context and that importing a teachers' PD policy from a different cultural context may not deliver satisfactory results, even if the policy comes from one of the most advanced education systems in the world. The reference in Section 2.5.2 to the novice teacher programme offered by the SIPTT was designed by experts from the University of Turku in Finland can be termed the borrowing of policy, with characteristics not commensurate with the Omani context.

5.7 Summary

This chapter has analysed data on the MoE's policy for the professional development of novice science teachers and the varied training methods adopted at the central, provincial and school levels. It has also examined the factors that prompted the Ministry to implement a new policy for the PD of NSTs and of novice

teachers in general. A number of issues raised here should be examined in depth as an integral part of the scrutiny of this policy. These include the CPD policy pursued by the MoE and the challenges stakeholders face in implementing it.

The two main issues related to this policy which will be highlighted in the following chapters are key stakeholders' expectations of PD provision for NSTs and the practical effectiveness of the policy from these stakeholders' perspectives. All of these emerging issues will be examined in depth in Chapter Eight. Meanwhile, Chapter Six will analyse data on the expectations of stakeholders regarding the provision of professional development programmes for NSTs as part of the Ministry's new policy outlined in this chapter.

Chapter 6

Research Findings 2

Key stakeholders' expectations of professional development provision for NSTs

6.1 Introduction

This chapter answers the second research question, concerning the expectations of stakeholders regarding the provision of professional development programmes for novice science teachers within the policy framework examined in Chapter Five. It focuses on three main issues, the first being stakeholders' expectations and perceptions of the support provided by the central and provincial training centres and in schools. Secondly, it examines the main topics that stakeholders expected to be included in the PDPs offered to NSTs and their views on the ways in which they should be provided. The third issue relates to what NSTs expect from the support of PDPs in their initial years of teaching.

Before discussing these topics, it is necessary to distinguish between two basic concepts in the findings of this study, which will be the themes of the sixth and seventh chapters, namely stakeholders' perceptions regarding their expectations of the future on one hand and their current experiences on the other in regard to PDPs for NSTs. This chapter discusses their future expectations, such as the aspects that NSTs expect that the MoE (the SIPTT) will address in order to meet their training needs, in addition to the complementary actions that should be taken by educational governorates (local training centres/science supervisors) and by schools (principals/senior teachers/colleagues) to support NSTs in the early years of the teaching profession.

There is also discussion of the SIPTT's expectations as to what support the educational governorates and schools should provide for NSTs and of the expectations of stakeholders (the Ministry/governorates/schools) regarding the response of NSTs in implementing the PDP skills offered to them on one hand and in undertaking self-development for themselves on the other.

Chapter Seven then reports the current perceptions of stakeholders as to the effectiveness of the new policy on the PD of novice science teachers and its impact on the learning and practice of NSTs. The discussion covers the experiences of stakeholders regarding the new policy for PDPs in the MoE (SIPTT), their experiences in delivering/receiving the programmes provided under the policy and whether it has met the needs of NSTs, both in terms of the content provided and the timing of delivery, in addition to following up the impact of training, all by comparing the experiences of all stakeholders involved in this study.

6.2 Levels of professional development and achieving policy objectives

As explained in Chapter 5 (Section 5.5) the MoE's policy on the PD of NSTs is delivered at three levels: in a specialized centre located at MoE headquarters; in regional centres, through science supervisors working for the educational governorates; and in schools, where PD is delivered mainly by senior teachers, principals and fellow teachers.

The following subsections analyse in detail the expectations of stakeholders regarding the provision of PD for NSTs at these three levels and the extent to which this provision is perceived to have achieved the policy objectives and to have met stakeholder expectations.

6.2.1 The Specialized Institute for the Professional Training of Teachers

Policymakers expected the delivery of PDPs by Ministry directorates, educational governorates and schools to be sufficient to support and develop NSTs in the early years of their employment. They pointed out that PD provision at these three levels and in multiple locations served a single shared goal, to develop teachers professionally so that they could carry out their mission. To illustrate this, policymakers mentioned the establishment of the SIPTT, noting that the MoE had provided it with all of the material and human resources required to provide quality training programmes for teachers, including NSTs. In particular, a dedicated induction programme offered to all novice teachers in their first year contained all that novices needed as a first phase, according to policymakers' expectations, as one policymaker stated:

> *The centre's programme is characterized by the feature that novice teachers receive direct and continuous support from the trainer, where the trainer continues to work with them for a full year through a WhatsApp group in order to support them in their required activities and tasks. The centre also contributes to the unofficially established professional learning communities among novice teachers. These … are formed from different governorates and disciplines in order to share knowledge, skills and methods of coping with challenges. (SCH)*

An overwhelming majority of participating policy implementers in the governorates agreed with the expectations of policymakers, seeing the SIPTT as having the potential to deliver a quantum leap in PD provision to teachers in general and to NSTs in particular. However, they also expected that there would be clear coordination between the Institute and the Directorate General for Human Resources Development, given its responsibility for the professional development of teachers at the MoE, as they feared the dispersion of efforts among them and the duplication of work in the governorates. They also looked forward to being involved in the planning and implementation of programmes provided by the SIPTT, because of their greater familiarity with the training needs of their teachers, whether beginners or experienced; in particular, NSTs are directly supervised by supervisors, principals and senior teachers in the governorates. One of the trainers referred to the issue of coordination:

> *We expect that there would be a strategic plan for this. There is the Qualification and Training Department at the Ministry and the main training centre at the ministry. There is the specialized centre, the Curriculum Directorate and the Scheduling Directorate, but there is no proper coordination between the specialized centres and the rest of the Ministry. We believe that if they united their efforts, then the returns from training would be better. (DhTRM)*

Analysis of the Ministry's documents relating to professional development reveals the existence of an annual plan for teachers' training in general, but which excludes programmes provided by the SIPTT. Nor does the organizational structure of the educational governorates cover direct responsibility for coordination with the SIPTT, perhaps because despite having been established in 2014, the Institute has not yet been incorporated into the general organizational structure of the MoE.

When I interviewed NSTs in February 2018, six months after their appointment as teachers by the Ministry, and asked about their experience of the SIPTT, they all stated that they had not yet enrolled in the novice teacher programme at the

Institute, nor in any other programme at the provincial centres. This provided a good opportunity for me to ask about their expectations of the SIPTT programmes that they would attend in future. They all agreed on the importance of the training programme, expecting it to answer many of their questions regarding the curriculum, methods of teaching, assessment tools and various issues related to their rights as new government employees. They said that they had expected to join the programme soon after being appointed, rather than six months or more later. They also hoped that the training would take place in their own governorates, so that they would not have to travel to Muscat, leaving their families for a week.

NSTs differed as to their views on the content of the programme itself, while agreeing that they had heard nothing from the Ministry or the governorates regarding the overall programme or its constituent modules, so the only information they had received was from colleagues who had attended the same programme the previous year. Some NSTs reported expecting the programme to be intensive, with the trainers demanding projects to be completed after each of the four phases, making them somewhat apprehensive about this expected work. One NST (DoTA) described his expectations of the induction programme at the SIPTT rather more positively: “My colleagues told me that it was an excellent programme and I would benefit from it and that there are a lot of tasks and it is compulsory for all teachers. I am excited about joining it.”

A novice from another governorate, however, expressed sharply contrasting expectations of the same programme:

> *I have heard about the specialized centre from my colleagues, but I do not want to join it. I’m busy with schoolwork. I do not want to miss classes with my students. The centre will also mean extra work, and I cannot do it... I am a novice teacher, and I learned many things required of me in school during the first semester, and therefore do not need to join the Institute’s specialized programme... I’ve heard about the projects and tasks and I feel that it would cause me pressure due to the heavy workload... If the programme was being run at the beginning of the year I would definitely be up for it, as it would help me prepare for the teaching profession and also I could just focus on the programme. (MsTH)*

This NST raises two important issues, also raised by 33 NSTs on the induction programme or planning to attend it, namely the timing of the implementation and

the tasks expected of the trainees after each phase. These issues will be discussed fully in the next chapter.

6.2.2 Provincial training centres and stakeholders' expectations

Policymakers argued that the governorates had the human and material resources necessary to provide appropriate professional development for novice science teachers. They all agreed that the annual plan for PD at governorate level had been carried out in accordance with central policy requirements and the training needs of the governorates.

Policymakers also emphasized that in addition to the training centres and the annual teacher training plan, the educational supervisors of science would conduct periodic visits to all teachers in their schools to provide the required professional support. One policymaker clearly expressed his expectations regarding provision at this level:

> *The educational governorates have their own budgets for training and can carry out training programmes for novice and experienced teachers in the governorate training centres, choosing the target group and implementing appropriate training programmes for them. (CDS)*

Another policymaker noted that the governorates had supervisors in each subject and that their primary responsibility was to provide support to all teachers including NSTs, who would be expected to use the Ministry's educational portal and benefit from its services.

> *Each governorate has independent supervisory staff that provide support and support to teachers. Some schools, not all schools, may have novice teachers, especially since the laws in the MoE assume that new teachers are sent to remote areas. The educational portal should be used more electronically, especially with so many smartphone apps that can benefit the teacher in teaching. Supervisors should intensify the first year of their visits, and follow up and help novice teachers especially at the start of their careers, and even stabilize and learn the curriculum. They really need to follow up and support at the same time. (CDY)*

These remarks about the role of the educational supervisor raise very important issues concerning the MoE's policy on the PD of NSTs, one of which is the assumption of policymakers that most novices are assigned to remote schools and therefore need support and professional development, as these schools lack many services. Five policymakers also expected the Ministry to activate the educational portal, an electronic platform created to provide various services for

teachers, such as PD programmes. Another issue raised by an overwhelming majority of policymakers was that the provincial science supervisors were expected to undertake intensive visits to NSTs during their first year of practice, to provide the necessary support and guidance in the curriculum, teaching methods and assessment tools. These issues will be discussed in the next chapter.

A sizable majority of provincial policy implementers affirmed that the governorates were trying to provide all the necessary support for novice science teachers, but argued that the infrastructure, resources and personnel of their current training centres were inadequate to replace the SIPTT in this role. They complained that the buildings were old and lacked both the modern equipment and science laboratories needed to train NSTs in scientific experiments, as well as lacking trainers in most specialties. In particular, there are no trainers of science in any of the provincial centres, according to the Annual Educational Statistics Book 2017/2018.

One of the implementers of policy at governorate level expressed his consequent low expectations of success:

> *The fact is that the training centres in the provinces are completely different. There are no technical staff or trainers in these centres, so we as the management of a centre can design a programme and meet the requirements of buildings, material costs, educational materials and invitations to attend the training centre, but we cannot implement the programme because there are no coaches and the educational supervisor is very busy. (MsTRF)*

Policy implementers also mentioned that the training centres in the governorates had offered an annual one-week programme for newly-appointed teachers before they started teaching. This programme included workshops on the philosophy of education in Oman, daily and quarterly planning, the introduction of the documentation of assessments, the use of the educational portal, the forms used in class visits, the rights and duties of employees under civil service law and finally, modern teaching methods. However, one policy implementer stated that this provincial programme had been abolished “because there is another programme that will be designed and implemented by the SIPTT” (MuGA). This is a reference to fact that the MoE’s policy was to provide some PDPs for NSTs, including the induction programme, at governorate level, but that all such

provincial programmes had been discontinued and replaced by others delivered exclusively at the SIPTT.

NSTs also appeared to have high expectations of their educational governorates, most of them expecting the provincial training centres to organize a programme during the first weeks of their appointment, in order to answer any questions that they might have on various issues related to teaching, especially given the diversity of the universities from which they had graduated, including educational institutions outside Oman in some cases, which meant that they would be unfamiliar with the philosophy of education in Oman and certain aspects of the national education system.

The expectations of the vast majority of NSTs participating in the study focused on the following aspects: a) having a reduced teaching load during their first three years to enable them to attend their various PDPs, b) receiving adequate support from the Ministry and the governorates as novice teachers, c) attending an introductory training programme before starting to teach, d) receiving support via visits by school supervisors, e) being informed of their rights and duties by the senior teacher and headteacher and f) being trained in the use of laboratories and the educational portal by their fellow science teachers. One NST expressed this expectation as follows:

> *I expect that we will be given guidance on teaching strategies and classroom management and the use of the laboratory, and I expect that it will be before the beginning of the school year, or during the first few weeks, in order to take advantage of these workshops in our teaching of students. (DhTZ)*

6.2.3 The school as a unit for professional development

Twenty-five policymakers and implementers argued that the role of the school had changed in the Omani education system, from a place simply to teach students to one which was also a teacher learning unit. All those interviewed indicated recognition of the concept of the school as a unit for professional development. These interviewees expressed the view that the professional development programmes in schools are an extension of the PD efforts of the governorates and the MoE, so that what is offered for NSTs at each of the three levels contributes to enabling them to practice the teaching profession effectively.

An overwhelming majority of policymakers considered that the facilities provided by the MoE in schools contributed to providing PDPs to all of its employees, including novice science teachers. They also believed that the following educational services, when guaranteed and coupled with the support of the governorates, were sufficient for providing quality PDPs for NSTs and other teachers: (1) the presence of a senior science teacher in each school to organize the PDPs for science teachers; (2) the allocation of a training budget for each school; (3) a school-wide training plan reflecting the needs of teachers; (4) specific days allocated by the Ministry for PD, before the beginning of the academic year and before the beginning of the second semester; 5) a learning resource centre in each school containing scientific books and computers connected to the internet that NSTs can benefit from.

Policymakers and implementers expected these five educational services to be sufficient to provide direct support in the school to novice science teachers. They also expected it to supplement the roles of the governorate and the Ministry in empowering NSTs with the necessary skills for the teaching profession.

Nine policymakers and implementers identified some additional components of the school environment in Oman that they would expect to provide genuine support for NSTs. For example, some referred to regulations which stipulate that one of the principal's roles is to provide support to novice teachers, along with colleagues who specialise in the subject, as well as providing a guide for each teacher in order to support them in delivering lessons. The expectations of policymakers and their implementers about the role of the school as a unit for professional development are illustrated by this contribution:

> *There are two aspects of professional development in schools. The first is the ministerial decision regulating the duration of the semesters and the holidays, which sets two weeks aside for professional development in schools, which are the first week of the first semester and the last week of the second semester in each academic year, providing ten days of professional development, where the school can cover in these ten days either one big general topic or specialized skills at the level of each article. The second aspect is that we have the so-called weekly subject meeting. This also includes some programmes at the level of the subject, either seminars or readings or lesson analyses, or a discussion of the developments of the subject. These training workshops are led by the senior teacher or one of the teachers who have prepared for it. (SqGS)*

A policy implementer referred to one of the objectives of the Ministry and governorates being to transfer PDPs to schools:

> *The training programmes have recently started being transferred to schools. That is, we have transferred them from the governorate training centre to the schools in order to allow teachers to practice what they were trained in at school. (MsGA)*

Seventy percent of policymakers and implementers raised a very important concern about ten of the schools where NSTs are employed not having senior teachers or being located in remote areas. In such cases, supervisors are instructed to intensify visits to the schools in order to provide the necessary support for NSTs. On the other hand, eight policy implementers in the category of senior teachers and supervisors of science criticized the functioning of schools as PD units, stating that while the role of the school as a training unit was not yet clear, they expected that if suitably empowered, schools could offer the appropriate PD to teachers in general and novices in particular.

The novice science teachers themselves differed in their expectations about the PD that they would receive at school. Ten of the 45 NSTs participating in the study did not expect that their school principal, senior science teacher and fellow subject teachers would facilitate their development and support them in their work performance, whereas the rest had high expectations of receiving such support through PDPs, senior teachers and colleagues in school. Three NSTs had not expected that they would be the only teachers in their specialization at their respective schools, because of the low student density in their remote areas, which made teaching difficult for them.

This diversity of expectations may be due to some teachers' failure to understand clearly the PD plan presented to them, if any. However, it is more likely due to a failure to provide clear information to NSTs by those concerned with the PD mechanisms at the central, provincial and school levels, during their early years of teaching profession. Those responsible may also have failed to explain to NSTs some of the ways in which they can overcome their difficulties and obtain support and professional development, either from neighbouring schools or through communication on social media with their fellow subject teachers.

In summary, the policy of school as a training unit is an issue of great importance for studying in the Omani context, with the aim of supporting the mechanisms for delivering PD to novice teachers in particular.

6.3 Key proposals for NSTs' induction programme and methods of implementation

Although there is more than one path to the professional development of novice science teachers in governorates and schools, the major focus of policymakers, implementers and NSTs was on the face-to-face training that is supposed to be available to NSTs, whether from the Ministry, governorates or schools. Thus, there were specific elements that stakeholders expected to be included in PDPs for NSTs. Some were commonly identified by all three categories of stakeholders, but there were also some differences in perception. The following four subsections consider first the topics proposed for the PD of NSTs in the induction programme, from the successive perspectives of policymakers, implementers and NSTs themselves, then the methods by which these stakeholders expected the PD of NSTs to be implemented.

6.3.1 Topics that policymakers expected to be covered

Most policymakers expected that PDPs for NSTs at the SIPTT would focus on three aspects: a) general induction issues such as education law in Oman, applicable regulations, future plans for education and the philosophy of education in Oman; b) intensive training in the subject of specialization that the novices would be teaching in their early years, whether physics, chemistry or biology; and c) modern teaching methods, especially those related to student-centred learning.

A strong majority of policymakers expected that intensive training in these three axes would address the issue of the differences in preparation among NSTs arising from the fact, noted in Chapter 5, Section 5.4.2, that they would have graduated from a variety of academic institutions, namely universities and colleges throughout Oman and abroad. Policymakers asserted that the Ministry had adopted the current PD policy for NSTs in order to address these differences, so that training in these three areas would reorient novices into a united group at

the beginning of their teaching careers. Moreover, most policymakers emphasized that the challenge facing NSTs was not in the scientific material, which was easily accessible to the teacher, obviating the need for workshops in each specialization; instead, those involved in the design of PDPs were expected to focus on teaching strategies, which are of great importance to all teachers at the novice stage.

As to issues relating to the application of assessment tools, the use of technology in teaching, classroom management and student coping mechanisms, policymakers expected that these should be dealt with at the governorate training centres and in schools, using a variety of methods such as short training programmes at provincial centres, educational supervisors' sessions with novice teachers in schools, training programmes offered in schools and senior teachers' meetings with NSTs.

An important belief emerging from the interview responses of policymakers on this topic was that the policy of professionally developing science teachers is a shared responsibility between MoE headquarters, governorates and schools, each of which has a role to play.

6.3.2 Topics that implementers expected to be covered

Provincial policy implementers felt themselves to be better aware than central policymakers of the needs of novice science teachers, because they supervised them, observed them in classroom situations and kept abreast of their professional development. There was thus a strong feeling among implementers that the transfer of NSTs' induction programme from the governorates to the central SIPTT had the deleterious effect of excluding them from the prioritizing of topics for induction training.

All interviewees from the six governorates emphasized the importance of NSTs focusing on subject knowledge during their early years of teaching, arguing that a strong grasp of the science would allow them to run their classes appropriately and to use strategies and assessment tools correctly.

Another priority identified by policy implementers was to inform NSTs of the daily and quarterly lesson planning mechanism. The first thing that teachers are asked

to do when joining the profession is to work out a quarterly plan for implementing the curriculum during their first semester and they will then need to derive daily or weekly teaching plans as required by the curriculum elements concerned.

The third area that policy implementers expected to be included in the induction programme for NSTs was how to use the continuous formative assessment tools correctly, in order for novices to meet the objectives set for each tool, taking into account the individual differences between learners, as an implementer explained:

> *The novice science teacher should not only apply assessment tools but must take into account individual differences when they apply them. There are weak, mediocre and good students, and there are those who have learning difficulties, and so these things should be present in the teacher's mind when he goes to school, and present in his planning so that he is not surprised in the classroom if some students don't understand the lesson. Otherwise, students can lose motivation if the teacher is unable to meet their needs and provide enriching activities for them. (DhGH)*

Ten policy implementers considered it important for NSTs to have a technological component in their induction programme, because there are many abstract issues in science subjects that can be clarified through technology and because teachers will need a firm understanding of the technological components of school laboratory work in order to conduct practical experiments successfully. One implementer expressed this view in these words: "The novice science teacher should be familiar with the technical programmes and devices that can be used as a medium in teaching science" (DhTRM). There were also ten implementers in the governorates, comprising training officials, educational supervisors and senior science teachers, who pointed to the importance of training NSTs in the skills needed to use interactive whiteboards, which they stated were now a basic part of the equipment found in all Omani school laboratories.

The fifth component that policy implementers expected to be included in the induction programme for NSTs was modern teaching methods. They anticipated that at university, novices would have studied many teaching strategies from a theoretical standpoint rather than a practical one and that many NSTs might have been exposed to traditional teacher-centred methods based on indoctrination. Therefore, they must be well trained in modern methods that focus on the student

as the centre of the learning process, applying these methods first in practice with fellow teachers in training workshops, then directly in the real-world environment of their schools on completion of the training programme.

Two final components which policy implementers considered it important to include in NSTs' induction training were classroom management methods and how to formulate questions for more gifted students. They expected NSTs to be able to manage their classes and to deal with the different behaviours of the students, which would require proper training in classroom management styles. As important as differences in behaviour among students, according to implementers, is the natural variation in ability within any given class; therefore, NSTs must be trained to formulate and ask questions to suit students of all abilities. Eight policymakers and implementers reported that the results of Omani students in international competitions and the national knowledge development programme in science and mathematics revealed a general weakness in understanding questions, especially those requiring higher ability. One participant said:

> *Our students are not used to the different types of questions, including ones needing higher thinking skills, because teachers tend to give students simple and modest questions, and because the only skill they assess is memorizing. (DoGA)*

It can be seen that there was clear divergence between policymakers and implementers as to what topics should be included in the induction programme offered to NSTs during their first three years, reflecting their differing perceptions of the programme. Thus, policymakers appeared to view it as an initial dose of training for NSTs, to be followed by other batches of PD delivered by the governorates and schools, whereas policy implementers focused on the transfer of the programme from the governorates to the MoE, believing therefore that it should include all components that novice science teachers would need to master.

6.3.3 Topics that NSTs expected to be covered in their PD

Participating NSTs, being recent graduates whose experience of the teaching profession was dominated by their contact with their college or university tutors, had very high expectations of the induction and PD programmes that they would receive from the SIPTT, the governorates and their schools. These expectations,

according to the NSTs' interview responses, arose from the perception of the MoE as determined to raise the level of achievement of students and to improve the educational service provided by raising the level of performance of teachers. Moreover, NSTs believed that the priority in their PDPs during the early years of their careers would be for them to learn from the other teachers, in order to form positive attitudes towards the teaching profession and the Ministry. Therefore, a sizable majority of NSTs appeared to have a positive outlook on teaching and on the PDPs that the MoE would provide.

The most important topic that 85 per cent of NSTs expected to be covered in the introductory programme and other PDPs was the curriculum that they would have to deliver during the school year. Their responses indicate several main reasons for assigning priority to this: the requirement to generalize in science teaching, the need to cover different grades from those for which they had trained and for some, no pre-service teacher training.

First, a large number of NSTs had studied the teaching of a single scientific discipline, either physics, chemistry or biology, whereas in reality schools in grades 5 to 10 in Oman treat these as elements of a single subject, called general science, which all science teachers must teach. The second reason is that a large number of NSTs had been transferred by the Ministry from the teaching of science at grades 5-12 to teaching science and mathematics at grades 1-4. They therefore expected the Ministry to support them in teaching maths and science to younger students by explaining curriculum units to them. Conversely, a number of NSTs had been recruited to schools in remote areas, where they were required to teach the 12^{th} grade (equivalent to the UK A-level) without prior experience in teaching science. These recruits thus also expected the authorities to provide strong support by explaining the modules of the 12^{th}-grade curriculum, since they, as novice teachers, would be delivering lessons which would significantly determine the future of the students. The final factor was that some of the interviewees had been appointed as science teachers after graduating from university and college courses that did not directly prepare them as teachers. They had been steered towards the profession of teaching by the need to find permanent employment, but with no academic background in the curriculum taught in schools. There were thus multiple reasons for NSTs to expect the

Ministry's PDPs to focus on explaining the science curriculum and the methods of teaching its various elements.

Given the importance of this aspect of their training from NSTs' perspective, it may appear surprising that it was not among the topics proposed by policymakers and implementers for inclusion in the induction programme and subsequent PDPs. Indeed, the curriculum and methods of teaching it do not appear on the list of contents of the novice teacher programme offered by the SIPTT, because planners of the NST development programmes believe that these are better addressed by methods of PD other than direct training programmes, such as in-school visits of educational supervisors to NSTs, workshops to explain the curriculum, or weekly school meetings of senior teachers with subject teachers.

There was, by contrast, agreement among NSTs and policy implementers on a second important component of their induction and PDPs, namely the continuous formative assessment document. NSTs asserted that what they had been taught about methods of educational evaluation in their universities and colleges was different from what was required in schools by educational supervisors, principals and senior teachers. They therefore expected the tools of continuous formative evaluation to be explained in practical rather than theoretical terms. They reported knowing that they would have to administer short tests, but not how to design them, when to apply them, or indeed why they were necessary. One NST said this:

> *The assessment document is very detailed, with very precise details, things we do not understand, such as homework and a short test. When we discuss this with our colleagues, everyone tells us different things but in the end, we do not get anything specific. (SbTBd)*

On the same topic, an NST from a different governorate said:

> *Explanation of the assessment document of continuing formation is necessary for us because it has the laws and principles and methodology which the teacher should be committed to applying, so why wait for years for a detailed explanation? Why not summarize all this and explain the document to me at the start? (DhTH)*

One topic which had not been mentioned by policymakers and implementers but which six NSTs in more than one governorate expected to be included in the induction programme was the rights and duties of the teacher. Although this was not specific to the teaching of science, the interviewees said that because they

were government employees, they believed that they should know their rights regarding salary, leave and other administrative and financial matters, as well as any non-teaching duties required of them, but that these rights and duties were not clearly stated in their contracts of employment and job descriptions.

The fourth expectation of the induction and PDPs raised by NSTs was that it should cover use of the MoE portal, an electronic platform for all stakeholder groups including teachers. NST interviewees said that they expected to have workshops on the portal, in order to use it in relation to their daily and quarterly plans, student care plans, laboratory reservations, leave and teacher requests, as well as some PDPs. Policymakers and implementers identified two particularly important icons on the portal: an educational forum responding to teachers' queries on all technical, administrative, financial and electronic matters, and a service called Zawiyati dealing with examination questions for all grades and subjects. In addition, there are working papers on a number of educational issues. A policy implementer explained the importance of the portal in these words:

> *The electronic portal is one of the achievements of the educational system at the present time. It includes the documents, curricula, and manuals needed by the teacher, but the teacher must learn how to use this platform. (ESZ)*

An overwhelming majority of NSTs also expected the programmes to cover the skills needed to use school labs. Science differs from the other school subjects in that it comprises two basic components, namely scientific theory, taught in the classroom, and its practical application in laboratory experiments, a number of which the curriculum requires to be conducted. According to their responses, NSTs believed that they would need to understand all of the lab equipment and acquire the skills of using it to conduct experiments, as well as learning the principles of health and safety for themselves and their students. Therefore, they expected to have workshops in the laboratories of the training centres, whether at the Ministry or in the governorates, to deliver all of the above, as this NST stated:

> *Preparation for lab work and laboratory management are among the skills that should be available to the science teacher and we must have a training programme where we learn to deal with laboratory tools and equipment and the security and safety systems. In addition, there are computer systems in the labs which we as users will need to know about. Every science teacher should also*

> *have a copy of the laboratory handbook and this manual should not be only for the lab technicians. (DhTIb)*

In summary, the expectations of NSTs were in line with those of policymakers and implementers on several points: that the induction programme and NSTs' PDPs must include training in modern teaching strategies, written preparation to explain lessons and classroom management. Given the importance of modern teaching strategies, NSTs expected to be trained in strategies appropriate to the particular area of science and the grades that they would be teaching.

6.3.4 Stakeholders' expectations of methods of PD for NSTs

Policymakers and implementers referred to seven distinct methods of professional development as being appropriate to this category of teachers at this stage, namely demonstrating to NSTs the delivery of typical lessons, exchanging of classroom visits among NSTs, both within and between schools, providing all NSTs with copies of the general New Teacher's Guidebook, the science-specific Teacher's Guide and the new educational bulletins for NSTs, practical application of PDPs and providing various learning resources in school learning centres.

Policymakers and implementers considered one of the most appropriate methods of PD for NSTs to be the demonstration of a typical lesson, whereby the senior science teacher or another science teacher with experience in the school would teach a full lesson attended by the NSTs at the school, with a focus on certain skills, such as introducing the lesson, using modern teaching methods, diversity in asking oral questions, assessment methods during class, classroom management and final evaluation. The presentation would be followed by a discussion session attended by NSTs, an experienced science teacher, the presenter, the senior teacher and sometimes various other experienced teachers. A policy implementer described the interest of the Ministry and the governorate in this method of PD as follows:

> *We have developed some methods of professional development, including a focus on applied lessons, as the Ministry has been very interested in these. In the governorate, we developed their submission. We choose a respected and successful teacher to deliver the lessons to colleagues, instead of the educational supervisor. I am assured that the applied lesson may be the best method of professional development and that it has resulted in an improvement in the performance of novice science teachers. (MsGA)*

An implementer from another governorate gave details of improvements to this method:

> *Among the methods of professional development that we are working to strengthen is the governorate's so-called applied lessons, and this is very important, with supervisors implementing these applied lessons at the level of schools, focusing on the skills needed by the teachers or where they have deficiencies. (SqGS)*

As for the methods that NSTs expected to encounter in their PDPs, Section 3 of the questionnaire asked them to rate expected PD methods by importance. Generally speaking, high mean scores, as shown in Table 6.1, suggest that NSTs valued all of the methods listed, but to varying degrees. It is also noticeable that the standard deviations are low, which suggests that the range of responses provided (on a scale of 1-5) was not wide. This indicates a degree of agreement among NSTs on their expectations of these methods. At the interview stage, teachers were asked to comment on these expectations, in terms of their importance and usefulness, and to provide some justification for their questionnaire responses.

Table 6.1: PD methods expected by NSTs (N=399)

Expected methods	Mean*	Std. deviation
Courses in science subjects in the Ministry's main training centre	4.61	0.77
Joining social networking groups for teachers	4.60	0.79
Informal meetings with other teachers	4.54	0.64
Observing other teachers' lessons in the same discipline	4.51	0.71
Practical sessions in the laboratory	4.50	0.88
Reviewing the teacher's guide to clarify aspects of the scientific subject and methods of teaching and evaluating the units of study in the subject	4.49	0.93
Attending conferences at the international level	4.44	0.96
Weekly meetings with the senior teacher in school	4.43	0.79
Preparing lessons jointly with colleagues	4.43	0.81
Delivery of an applied lesson for teachers of specialization in school and discussion of the lesson with colleagues	4.40	0.82
Observing other teachers' lessons in another discipline	4.39	0.87
Training days in school before/after the school year	4.32	0.91
Reading educational publications issued by the Ministry	4.23	0.73
Attending conferences at the national level	4.21	0.84
Making use of the Ministry's educational web portal	4.20	0.79
Professional visits to other schools	4.20	0.88
Reading educational publications issued by the governorate	4.10	0.74
Senior teachers' visits and observation	3.90	0.67
Upgrading degrees and qualifications, Higher Diploma in Education or MA	3.80	0.83
Curriculum-support workshops and seminars in local training centres	3.66	0.71
Periodic meetings between NSTs and officials in the governorate	3.60	0.93
Teacher trainers' visits and observation	3.54	0.72
Methodology training courses during the school year in school	3.53	0.72
Methodology courses in local training centres	3.50	0.77
Supervisors' visits and observation	3.45	0.70
Reading professional material, e.g., books on modern teaching methods	3.42	0.61
School principals' visits and observation	3.40	1.03
Electronic training programmes	3.32	0.85

* Mean scores are out of 5

The following observations can be drawn from Table 6.1:

1) The highest mean score (4.61) was for *Courses in science subjects in the Ministry's main training centre*, which indicates NSTs' acceptance of the PD programme offered at the SIPTT and their satisfaction with it, whereas a relatively low mean of 3.50 was scored by *Methodology courses in local training centres*, which may mean that PDPs for NSTs in these centres were poor or that such programmes were not conducted there.

2) Among the methods of delivering PDPs of which NSTs had the highest expectations were: *Practical sessions in the laboratory* (mean: 4.50), *Reviewing the teacher's guide to clarify aspects of the scientific subject and methods of teaching and evaluating units of study in the subject* (4.49), *Attending conferences at the international level* (4.44) and *Delivery of an applied lesson for teachers of specialization in school and discussion of the lesson* (4.40).

3) Table 6.1 also shows that seven of the methods which NSTs expected and preferred most strongly, conferring mean scores from 4.39 to 4.60, can all be seen as related to the important topics of professional learning communities and communities of practice, to which I shall return in Chapter 8. These methods are: *Joining social networking groups for teachers, Informal meetings with other teachers, Observing other teachers' lessons in the same discipline, Weekly meetings with the senior teacher and colleagues in school, Preparing lessons jointly with colleagues, Delivery of an applied lesson for teachers of specialization in the school and discussion of the lesson with colleagues* and *Observing other teachers' lessons in another discipline.*

4) Visits and observations conducted by educational supervisors, principals, teacher trainers and senior teachers received the lowest mean scores, from 3.40 to 3.54. A reason commonly given by NSTs in interviews was that such visits were aimed at evaluation rather than support.

When interviewed, ten of the 45 NSTs acknowledged that the delivery of applied lessons was an important method of professional development but identified a problem with its implementation, namely their perception that their respective senior teachers insisted that they should deliver such lessons to more experienced colleagues at a stage in their careers where they did not yet feel ready to do so, because they lacked experience. Although both policymakers and implementers also described this method as important in the development of NSTs, its mechanism of application appears to remain unclear to those in educational districts and schools who are responsible for implementing it, which may be seen as a weakness that should be addressed.

Stakeholders generally expected the appropriate methods of PD to include the exchange of classroom visits among NSTs, both within and among schools.

Indeed, this is one of the more common methods of PD for NSTs that school administrations adopt, especially when there is no senior science teacher. The importance of this method was acknowledged by policy implementers in the governorates, especially supervisors and senior teachers, who described it as easy to implement in schools, and as being beneficial in improving and developing teachers. Most NSTs agreed on the importance of exchanges, especially as they expected to share information with their fellow teachers about dealing with students and ways of applying modern teaching strategies.

Policymakers collectively identified the New Teacher's Guidebook, the subject-specific Teacher's Guide and the various educational bulletins as among the most important means for NSTs to gain the necessary knowledge and skills at the beginning of their teaching careers. One policymaker (CDY) described the Guidebook as aiming to give novices "a full view of what the new teacher should be aware of in their early years of teaching", while another explained the value of the Teacher's Guide to Science as follows:

> *It contains many of the guidelines used by the beginner to apply the curriculum both in terms of educational outputs or group learning, which should be taken into consideration before the introduction of a particular lesson. The guide also covers how to observe individual differences in terms of students' levels, as well as some enrichment activities and training provided to these students, so each lesson contains many data that help the teacher to implement the lesson, in addition to assessment activities. (CDS)*

Another policymaker (HRM) emphasized that educational publications achieved many purposes, such as correcting scientific errors in the textbooks, clarifying the distribution of units and the timetabling of lessons, to help the novice teacher understand how long a particular unit or lesson should take, and explaining how it fits within the curriculum.

Thirty-six NSTs pointed to the importance of providing them with the Guide to Science, the continuous formative assessment forms and educational bulletins at the beginning of their careers, stressing the value of these documents in giving them a degree of confidence in their classroom demeanour and in preparing them to conduct lessons in the approved manner. In addition, they expected the Ministry to provide a booklet, bulletin or manual, or to schedule a meeting

explaining the administrative aspects of their status as new government employees, such as the rights and duties that they would be expected to know.

Due to the nature of science teaching as comprising both theoretical and practical components, NSTs expected that the PDPs offered to them would not be devoid of practical application in the laboratory, especially with regard to experiments in physics, chemistry and biology at the different grades. A sizable majority of NSTs noted that science teaching requires the acquisition of the skills needed for laboratory work, the preparation and conducting of experiments and drawing conclusions from their results. They also recognized the need to master technical aspects of lab work, such as the use of interactive whiteboards and dedicated computer applications, and emphasized the importance of using the educational portal to reserve the laboratory time and work on plans for experiments. NSTs must have PDPs that deliver all of these skills in a practical way, so that they are able to apply them properly in practice.

Policymakers and implementers placed more emphasis on the need for all PDPs offered to NSTs to cover both theoretical and practical aspects of the work. While observing that there were no science labs in the SIPTT or the provincial training centres, policy implementers in the governorates stated that they would ensure that a full day of each PDP would be dedicated to practical application by arranging for a local school to allow its laboratory to be used for the training of NSTs.

A marginal majority of NSTs expected the MoE and the governorates to provide other assistance to them in pursuit of their professional development, such as opportunities to participate in conferences held at Sultan Qaboos University or other higher education institutions, or in the annual Science Festival, as well as facilitating their networking with other science teachers from the various governorates of the Sultanate. Other such support would include the provision of lists of references, journals and other scientific resources in schools.

6.4 NSTs' expectations of the support associated with PD programmes in their first three years

All NSTs expected the Ministry, the governorates and their schools to provide them with the facilities they would need to obtain full benefit from the PDPs at this crucial point in their teaching careers. They also expected the various officials to treat them sympathetically so that they would not experience the transition from study to work as a culture shock. Consequently, NSTs expected to find support from policymakers and implementers in their first three years at the very least, to help them to overcome any difficulties and obstacles to their professional development that they might face at the novice stage. NSTs envisaged such support as related to potential difficulties in four areas, which the following subsections consider in turn: their workload, working with colleagues, the school environment, and laboratories and teaching aids.

6.4.1 Workload

A sizable majority of NSTs said that they would expect the Ministry to direct the governorates and schools to reduce the number of classes taken by novice teachers, so as not to exceed 16 from a potential maximum of 40 weekly lessons. This easing of the workload would help them benefit from PDPs and offer them more opportunities for self-development. This response was prompted by the fact that the MoE assigns NSTs in its schools to full-time teaching immediately after graduation, provided only that they pass a written test. Thus, there is no period of transition, training or probation before they begin full professional practice; from the outset, all of their duties are similar to those of their experienced colleagues.

One policymaker agreed with NSTs on the importance of reducing their teaching load for at least the first year: "Novice teachers should begin with a very diluted schedule in the first semester, with an intensified PD programme during this period. Three days a week for work and two days for professional development" (ESF). Three policy implementers from different governorates went further, proposing a foundation year, or a probationary year, during which NSTs would be introduced to their new role in gradual steps while enjoying opportunities for PD and acquiring the necessary skills along the way. One of these implementers expressed this expectation as follows:

> *There should be a year of foundation or probation, to assess the ability of the novice science teacher in teaching the branches of science, taking into account the need for a providing a reduced teaching schedule, within the limits of 15 lessons per week, so that they can practice scientific opportunities and apply them, which would give them the full opportunity to teach science. (MuGA)*

The expectations of policymakers and implementers regarding teaching load lead me on to the extent to which NSTs reported finding it difficult to balance workload with benefiting from PDPs in their early years, possibly because of their poor time management skills or the size of their non-teaching workload. An overwhelming majority of them reported being obliged to undertake tasks unrelated to teaching, within and outside school, which in their view hindered their access to school-based PDPs, as this NST complained:

> *In fact, before I enrolled in the teaching profession, I had no idea that teachers had to do things that had nothing to do with teaching, such as the observation of students in the break, between classes and at the end of the school day. I have 23 lessons a week, so why do I have to monitor students taking buses and other administrative work? I don't have time to attend professional development programmes. (DhTNh)*

This raises two important questions: How aware are NSTs of their rights and duties and of the tasks required of them within the school, and do their PDPs cover this aspect of their employment?

One of the male NSTs raised another issue related to workload in the early years, especially in male schools:

> *There is a general situation in our schools, especially all-male schools, where the novice science teacher gets as many weekly classes as possible, although they're supposed to have the least. Also, they are sometimes given the harder grades with more intensive work, and sometimes the difficult classes. Sometimes the novice science teacher is given difficult classes in which there are a number of students who are struggling and who need greater effort... I do not think that as a novice, you should have more weekly classes than the older teachers. (MsTM)*

This illustrates another aspect of the workload allotted to NSTs: not only does it limit their opportunity to benefit from PDPs, but it also increases the pressure on them. When I followed up on this point with more questions about why this situation persists, the same NST replied that "the school administration and my colleagues see new teachers arriving and assume that they will just accept whatever workload they're given, and they're not allowed to refuse or object to this" (MsTM).

This example shows how much the school administration and longer-serving teachers impose their authority on the novice, as another NST said:

> *The fact is that because I am a first-year teacher, I could not go to the head teacher and discuss the subject of the workload, and all of the other work that I was assigned. If I were in my fourth year of teaching, I would have gone to the administration and discussed this matter. The first year you feel that you are a guest at the school, and therefore you should not discuss these aspects, so that you do not appear to be complaining about work. (DhTA)*

There were two further issues that NSTs expected the Ministry to take into account, namely the increased burden of work on novices when teaching higher grades and students of mixed grades. The first of these refers to the requirement to teach individual sciences (physics, chemistry, biology) at grades 11 and 12, to students aged 17 and 18, which NSTs perceived as particularly burdensome because the outcome would largely determine the future of the students. Thus, teaching these two grades calls for experience, a thorough mastery of the course material, familiarity with the different teaching methods, and great skill in communicating the science smoothly and easily, which teachers tend to lack in their early years.

> *The MoE and the governorate must take into account that novice teachers should not be required to teach higher grades at the very start of their teaching careers in schools. I would have expected to teach grades 7 and 8 rather than grade 12 directly ...I could not give the girls of this grade the knowledge they deserved and I was shocked when the school allocated me to grades 10 to 12, but I couldn't discuss this matter with anyone. (DhTZ)*

Other NSTs explicitly stated that the workload involved affected their professional development. Seven of them indicated that despite being in their first year, they were teaching eleventh and twelfth grades, which involved a heavy burden of work due to this being the last rung on the educational ladder of school students in Oman. The teachers concerned were thus prevented from attending any PDPs, either in school or at the provincial centre, for fear of missing some of the weekly classes. Furthermore, novice teachers who have to teach higher grades are usually at more remote schools with small student numbers, where there is often only one class in each grade. Such schools will tend to have only one or two science teachers, each of whom will have to teach multiple classes. They would be reluctant to attend any PDPs offered to them at the provincial training centre because of the distance from their remote location, adding to the time needed,

and the consequent fear of missing a number of lessons which they would find difficult to make up later. When I discussed with policymakers these NSTs' perceptions of the burden of work and the pressure arising from teaching higher grades without experience, they simply responded that it was inevitable because of the nature of these schools.

A related issue raised by NSTs was teaching at multiple levels of study during the academic year, as the vast majority of NSTs reported having to teach at more than two grades. NSTs perceived this as a great burden in terms not only of the teaching itself but also of preparation and assessment. A provincial policy implementer gave this account of the issue:

> *We hear complaints from novice teachers because of the multiplicity of curricula they teach. It's an additional burden on them and therefore it affects the students' results. It's a counterproductive policy. It's the new teachers who are appointed to remote schools, as part of the plan for the distribution of new teachers, because the official policy is to keep the experienced teachers close and to send the new ones to the more remote areas. This is all back to front in terms of who needs support from us. We supervisors can't easily access these remote schools, so the novice teachers don't get the number of visits they need from us, and they often have no senior teacher, and on top of that there is a lack of electronic programmes to help them in professional development. (SbGM)*

This subsection has provided clear evidence of the extent of the impact of workload on science teachers in their early years, including on their participation in PDPs and on their self-development. A major contributory factor would seem to be the Ministry's recruitment policy. It also appears that policymakers tend to assign NSTs the same workload as experienced teachers, without any consideration of them being new to the teaching field, a policy that in my view should be reconsidered.

6.4.2 Colleagues

In Chapter Five, Section 5.5.3.3, I identified school colleagues as one of the most important sources of professional development for science teachers during their early years, being well placed to provide help quickly and easily to NSTs facing any teaching difficulties, because of their experience of school life, the students and school administration, as well as the science subjects themselves. All participating NSTs said that they expected to receive strong support from their more experienced fellow science teachers, as well as from other teachers in

school. Support from colleagues within the school takes several forms, such as discussion in the teachers' room, questions answered directly by individual teachers and weekly meetings of subject teachers, as well as reciprocal class visits, a common method of PD among teachers, mentioned by most of the novice sciences teachers. This means that novices would visit experienced colleagues in order to observe the practice of classroom management, subject presentation and student assessment. Conversely, experienced teachers would visit novices, attending their classes and offering feedback about what they observed there. One of the NSTs spoke in favour of such visits:

> *I've benefited from my older colleagues very much, since in this school there are teachers with long experience, including 16, 19 and 27 years, so this school has a great impact on ... Therefore, I suggest putting all novice teachers in schools with more experienced teachers, because this is very important for the novice teacher in his early years. (DhTIb)*

Three other NSTs expressed their satisfaction with the support of colleagues:

> *My colleagues in the school have a great role in supporting me and developing my skills. As a novice teacher sitting together in the teachers' room in discussion and dialogue, they give us a general and realistic picture of teaching, students and the subjects. (MsTG)*

> *The main reason I was able to overcome the difficulties I had in my first year of teaching was the great support I received from my school colleagues. (DoTNh)*

> *I expected that I would be on my own and might have to rely on myself for everything, but I found I got great help and support from the school principal, the senior teacher and my colleagues especially at this school. (MuTB)*

These contributions, by NSTs from different governorates, indicate the importance of the support of fellow teachers in many areas that may not be addressed by the training programmes, as well as visits by more experienced teachers and supervisors of the subject.

Some NSTs spoke of various other forms of support offered by school colleagues, whether at school or outside. One described the valuable help she had received from school colleagues in other disciplines:

> *I have also benefited from the advice of teachers of other subjects in the school, such as in technology recruitment, classroom management, classroom questions and other educational skills relating to teaching methods. The senior teachers in our school have a lot of experience in ways of encouraging students. (DhTNh)*

Another teacher spoke of the informal support of colleagues outside the school:

> *Sitting together in the accommodation with my colleagues in the same subject discipline and preparing lessons together gave me great confidence and rich experience. (DoTSa)*

The final pattern of colleague support reported positively by an NST was the use of a social network (WhatsApp) to share experiences and information among science teachers at the same school: “Usually, our discussion is in the teachers’ room when we are not busy, but now we also discuss things in the school WhatsApp group, whenever we don’t have time to chat in school” (MsTK).

On the other hand, a marginal majority of policy implementers and NSTs reported negative expectations concerning the support offered by colleagues to NSTs, referring to negative messages that they might send and to poor support that they might provide. A policy implementer gave this detailed account of some of the issues involved:

> *The biggest problem that affects novice teachers is negativity on the part of older teachers. 70% of the old teachers do not implement all of the items of the continuous formative assessment document, and when the new teachers see that some of the old ones skip lessons, don’t use teaching aids, or don’t implement the formative assessment tools, they will do the same. Therefore, as a senior teacher in the school, no matter how you try to guide them, you are struggling against the behaviour and guidance of these colleagues. So when I ask the novice teachers to do this or that task, they come to me and say that the teachers in the other subjects don’t do it, so why should they have to do it? (DhHTS)*

Another policy implementer gave a further example of the impact of certain older teachers:

> *There is a category of teachers who have reached a degree of saturation and boredom with the teaching profession, who don’t care about any instructions and therefore indirectly send negative messages to their fellow novice teachers. (MsST)*

Some NSTs also complained of a lack of support from colleagues, which fell short of their expectations, as one of them elaborated on in this response:

> *Unfortunately, we still have difficulties in our early years, because the older teachers and the senior teacher have no knowledge or awareness of taking the lead and developing their novice teachers, unless the novice teacher requests it himself and asks for their help. When we attend classes with my older colleagues there is no organized process of such issues by the senior teacher towards the novice teacher, so there is no one to help you and support you ... You find everyone is busy and the experienced teachers seem to stick together, making them less receptive to the new teachers. Yes, they allow me to enter their classes,*

> *but without any feedback session and therefore I've found it too general and superficial. (MsTA)*

Despite the demonstrable importance of the role of colleagues in supporting the PD efforts of NSTs, I have found nothing in the written documents or the Ministry portal to indicate the importance of strengthening this aspect; nor did any of the policymakers participating in this study refer to the valuable role of colleagues in supporting NSTs in their early years. This indicates a pressing need at policymaking level to address the formation of PLCs and communities of practice, to be discussed in Chapter Eight.

6.4.3 The school environment

The school environment is one of the factors that motivates the acceptance of PDPs. The data provided by all categories of participants in the present study, whether policymakers, implementers or novice science teachers, support the contention that when teachers are comfortable in their school and feel that they have good mental health, their teaching will be better and their enthusiasm for PDPs greater. The issue of environment and its relationship to the PD of NSTs is of particular relevance for two reasons: because around three quarters of novice teachers in Oman are assigned to schools outside their home governorates and in remote areas, and because the MoE has in the last three years changed the assigned specialization of 60 per cent of NSTs from general science teacher of grades 5-12 to second field teacher of grades 1-4 (MoE 2016). The school environment in which many NSTs find themselves thus has many negative features, such as having to leave their family or having to cope with the reduced, inadequate or absent educational facilities available in remote areas, such as poor or non-existent internet connectivity, which impedes their access to professional self-development. In addition, small rural schools often have no senior science teacher and, as noted in Section 6.4.1, their remoteness from provincial centres means that there are few supervisory visits and that NSTs may find it difficult to attend PDPs organized in the governorate training centre. A policymaker addressed the issue of recruitment in remote areas and offered suggestions of how to overcome the attendant challenges:

> *Yes, some schools but not all schools have novice teachers, especially as the existing laws specify that novices should be appointed to the more remote areas,*

> *which is already a challenge that exists in the Ministry ... But the use of social media and the e-learning portal by novice science teachers have reduced this challenge. Modern techniques should be used more, especially with the presence of many technologies in smartphones that can benefit the novice teacher in teaching, but before that the governorate should identify the places where there are novice teachers and intensify their professional development programmes in their first years, such as through visits, follow-up and providing assistance. (CDY)*

The above response illustrates the challenges facing the MoE in ensuring the provision of PD for NSTs, especially those employed in remote areas, but the Ministry's policy takes into account the following three factors: The first is that teachers are assigned to posts away from their place of residence when there is no vacancy in their own governorate. The second is the existence of modern technologies, such as the MoE's education portal and phone applications, which can be used to help NSTs with their professional development. The third is the need to intensify PDPs for this category of teachers in their early years.

Another policymaker acknowledged the challenge and suggested a possible solution:

> *The appointment of teachers outside of their governorate of residence is a challenge for the Ministry itself. These teachers are considered somewhat oppressed. In this case, we have to rely on the supervisors to carry out the professional development programmes. The Ministry is supposed to focus on these remote areas due to the fact that most of the new appointees in those schools are novice teachers and that a novice is often the only teacher of science in the school, so it may not be possible to benefit from the experience of a fellow teacher. This means that the supervisor needs to play a very prominent role, especially as the structure of the supervision system in Oman depends on the presence of a supervisor for each discipline in all of the governorates. (ESZ)*

According to a policy implementer from one of the governorates, supervisors did indeed play a strong role in supporting NSTs:

> *Our plan is to give these schools priority through supervisor visits so that the visits are directed to the remote schools. For schools where there is no senior teacher, the supervisor uses the method of applied lessons and workshops to enable novice teachers to develop professionally. (SbTRY)*

One of the participating NSTs recounted his experience of finding himself in just such a challenging school environment and his own suggestions to facilitate the PD of science teachers:

> *I had the same difficulty. I was the only science teacher in the school, with no senior teacher and very few supervisor visits, yet I had to teach five different curricula. There was no laboratory technician in the school, so I had no alternative but to contact my colleagues continuously. So I suggested setting up meetings*

> *for novice science teachers every two weeks with the supervisor, or a senior teacher, to develop them professionally, and suggested using a WhatsApp group for them to share their information and skills. (DhHTS)*

Very many NSTs pointed out the inadequacy of PD provision in remote areas, including the shortage or complete lack of supervisory visits; indeed, one of the governorates where I conducted interviews had no science supervisor. They also complained of other shortcomings of their school environment, such as poor connectivity to the Internet, on which policymakers depend for NSTs to access the Ministry's education portal and to use its PD services.

For their part, policymakers asserted that internet access was available in all schools, whether via fixed lines or by modem for those schools having no fixed-line connection, yet teachers often complained of the limitations of their schools' networks. For example, some said that the internet was used for administrative tasks relating to school records, such as introducing plans, registering student attendance and recording the attendance of teachers, rather than for PD and teaching purposes. Others reported that the Wi-Fi signal was too weak outside of the school administration rooms for teachers to rely on it for internet connectivity.

One of the policy implementers raised another aspect of the school environment and its importance in supporting the professional development efforts of NSTs, namely that some school administrations were too "traditional". In other words, some head teachers refused to use modern technologies, such as mobile phones or electronic means of preparing and delivering lessons, with the result that some NSTs would encounter head teachers who were accustomed to the exclusive use of traditional methods of teaching and reluctant to change.

> *The new teacher will have had some experience of various uses of technology, either through study or practice, and will want to use some of these, like smartphone apps, to teach their students, but some school departments refuse to allow these methods, insisting that mobile phone use is prohibited in class, for administrative reasons only (DoGA).*

Two further matters raised by NSTs can be seen as related to the school environment. First, some school administrations were said to refuse to allow NSTs to enrol in training programmes at the governorate training centre, or at the SIPTT, either because some had not completed their work at school or because principals wished to avoid the absence of a large number of teachers at one time.

An NST (MuTf) gave this specific example: “The head teacher disagreed with us leaving during the school day to attend the training programme, and asked us to finish our business first, then we could go”. Finally, some NSTs who had been released to attend training sessions in the vocational centre spoke of their inability to apply the skills they had learned there, whether because their head teachers refused to implement various strategies, or because the school lacked the resources necessary to implement the practices for which they had been trained.

Consideration of all of these issues related to the school environment and its impact on the PD of NSTs underlines the need to identify policies that support the MoE’s policies in support of science teachers. In particular, it is essential to implement specific mechanisms for recruiting teachers to work in remote areas, or to provide special PDPs for such schools, and before that to educate school principals and educational supervisors in the importance of using modern techniques in teaching, especially in the various branches of science.

6.4.4 Laboratories and teaching aids

Science labs are an integral part of the school environment. Ministry documents state that the school laboratory is a component of the school building in Oman’s basic and post-basic education system. Therefore, a science laboratory is found in all schools of the second cycle, while those teaching grades 11 and 12 each have two and sometimes three laboratories, equipped with all the tools, equipment and devices needed to teach science subjects. Each laboratory has a lab technician whose responsibility is to provide technical support to the school’s science teachers (MoE 2015). The importance of the MoE’s interest in these laboratories arises from its curriculum policy that 70% of the teaching of science should be of a practical nature, delivered in laboratories. Therefore, since 1998, the Ministry has endeavoured to equip school laboratories in such a way as to ensure the achievement of this objective, providing them with equipment such as interactive whiteboards, computers and storage facilities for chemicals (MoE 2017).

Given the officially recognized importance of school labs, this final subsection of the current chapter examines the expectations of science teachers regarding the support given to them in relation to laboratory work, alongside the responses of

policymakers and implementers on this topic. First, the data show that the overwhelming majority of NSTs expected their PDPs to include teaching skills in the laboratory, dealing with student groups, how to conduct scientific experiments and draw conclusions, handling laboratory tools and devices, as well as a knowledge of the administrative aspects of lab work and of measures to ensure security and safety in the laboratory.

Contrary to these expectations, NSTs in the six governorates asserted that they had had no PD training at the SIPTT or the governorate training centre, or even a simple in-school training session, to prepare them for the administrative or technical aspects of delivering a science lesson in the school laboratory. These teachers also reported having encountered significant difficulties during their first year of service related to the use of the laboratory, the preparation and performance of practical experiments and the drawing of conclusions, as well as to administrative matters such as reserving sufficient laboratory time and the introduction of the teacher plan on the MoE portal. These problems were particularly common among NSTs who had graduated from educational institutions outside Oman, many of whom reported that they been told nothing in relation to school labs and had had no practical lessons in laboratory work.

Five policymakers asserted that the relevant MoE directorates had specific responsibility for equipping laboratories adequately to enable science teachers to deliver the practical lessons prescribed by the curriculum. They also stated that at least one laboratory technician was appointed to each school from grades 5 to 12 and that post-basic schools had two or three technicians, specializing in physics, chemistry or biology, to support the work of science teachers. The MoE's Statistical Book No. 38 reports that there are 954 lab technicians in the Sultanate's public schools and policymakers considered this adequate to provide the relevant support to NSTs. In addition, school laboratory supervisors in each governorate, numbering 37 in the whole of Oman, visit schools and provide support in coordination with fellow science supervisors (MoE 2018a).

Three policy implementers pointed out that support for novice science teachers in the laboratory is the responsibility of the school, whether provided by the school's senior teachers, lab technicians or visiting supervisors. They also noted

that a printed guide to the conducting of scientific experiments is provided for each school, while science teachers can additionally benefit from bulletins and the laboratory pages of the education portal. The policy implementers also stated that their provincial training centres offered no special training programmes on how to use laboratories simply because they were not themselves equipped with science labs. Whenever any training programme for a branch of science required the use of a laboratory, they were obliged to conduct these practical aspects of the course in a nearby school lab.

NSTs reported having received no training in laboratory use, as a result of which fifteen said that they had difficulty in preparing experiments and in using the lab, compounded by being unable for one reason or another to rely on the help of a laboratory technician in their school. For example, one NST gave this account:

> *The laboratory materials are not always available, and the technician is assigned to several schools, so we have to fulfil multiple roles, as our own laboratory technician as well as the role of the science teacher. (MsTM)*

In contrast, 25 other NSTs praised the contribution of laboratory technicians, senior teachers, fellow science teachers and lab supervisors in enabling them to use the laboratory to conduct practical lessons while observing the rules of safety and security.

This subsection has adduced clear evidence that a laboratory technician may be available in one Omani school and not in another, that some schools do not have a senior science teacher to provide the necessary practical support for NSTs and that this is especially burdensome for those working in remote areas, where there are fewer visits by supervisors. I believe that it is therefore of great importance to ensure that NSTs are trained in the various aspects of laboratory work as an integral part of preparing them to fulfil their teaching role successfully.

6.5 Summary

This chapter has offered an analysis of stakeholders' expectations and perceptions regarding the professional development of novice science teachers. It has addressed four key issues: their perceptions of the extent to which the MoE's PD policy objectives have been met; the main topics that PDPs for NSTs should address, from the perspective of the various stakeholder groups; the

methods that they expect to be used to implement PDPs for NSTs and the expectations and perceptions of NSTs as to the support associated with PDPs in their first three years of teaching.

The discussion has highlighted a number of issues that need to be studied and discussed more broadly; for example, the way that education systems throughout the world treat the school as a unit for the professional development of teachers and the extent to which Omani schools are seen to play this role, given that the Sultanate's education system is an integral part of the global education system and is influenced by this. A final equally important issue worthy of note here is that of the PLC as a model that can be employed to overcome the challenges facing the provision of PDPs in Omani education. I will discuss these emerging issues in depth in Chapter Eight; meanwhile, Chapter Seven will assess the effectiveness of the MoE's new policy of professional development in practice and implementation, from the perspectives of the key stakeholder groups.

Chapter 7

Research Findings 3

Implementation and Evaluation of the New Policy

7.1 Introduction

This chapter answers the third research question, by reporting the perceptions of stakeholders as to the effectiveness of the new policy on the PD of novice science teachers and its impact on the learning and practice of NSTs. The analysis presented here seeks to determine the extent to which the PDPs provided meet the aspirations of policymakers and policy implementers and the needs of NSTs. The chapter begins with stakeholders' accounts of the shock that science teachers often experience at the beginning of their teaching careers, then considers its relationship to the PDPs. There follows a comparative analysis, examining similarities and differences among the responses of the different groups of stakeholders, and the chapter ends with a summary.

7.2 The shock and struggle of novice science teachers

In their interview responses, 22 of the 45 NSTs used the Arabic word "صدمة", which may be translated as 'shock', to express their initial impressions when entering the teaching profession. They reported being very perturbed about their experience of school life in the early part of their careers and this explains their use of the term. Shock can take many forms and the NSTs explained that they were referring to a kind of reality shock which they suffered upon encountering unexpected negative experiences; in other words, what shocked them was the discrepancy between their expectations and their actual school life. An important element of the shock that these inexperienced teachers reported feeling was the anxiety that arose from finding that the situation in which they found themselves was incompatible with what they had been led to expect. They agreed on the importance of improved professional development programmes because, in their view, appropriate PD delivered before they started teaching would have reduced the severity of this shock. In Chapter 1 (Section 1.2.4) and Chapter 5 (Section 5.5.1.4), it was mentioned that the MoE's current policy is to recruit science

teachers directly from among new graduates of universities and teacher training colleges on condition of passing a written test of employment but without an induction programme before beginning to teach. The lack of opportunity for a gradual adjustment to their new role can cause novice teachers to describe their first experience of teaching as a shock. In her interview, one NST gave this account of how her duties diverged from her expectations:

> *I found out that the teacher is not only concerned with scientific subjects, teaching methods and assessment tools, but that there are compulsory tasks within the classroom, administrative aspects that must be mastered in these subjects and activities in these areas of specialization. So these things shock the teacher because they are not aware of them at all. (DhGH)*

It is clear that the shock expressed by some novice teachers was caused by being assigned work they were not prepared for or simply being overworked in terms of the teaching burden, as another teacher stated:

> *Teachers are surprised and shocked by the large number of lessons and the pressure of work, the extracurricular activities and the lack of support, all of which leads to us becoming stressed and frustrated. (DoHTN)*

It should be kept in mind that the NSTs above all used the Arabic word "صدمة" referred to at the beginning of this section. It was also used in relation to another issue that NSTs often raised in the interviews, namely having their specialization changed from physics, chemistry or biology to second-field teachers of maths/ science. Statistics on NSTs' appointments for 2019/2020 indicate that 195 teachers of the three science disciplines to students of 11-16 years were reassigned by the MoE as second-field teachers of the 6-10 age group. The interviewees reported that having trained and qualified to teach secondary school students, they were shocked at now finding themselves as second-field teachers, despite lacking the skills needed to teach primary school pupils. They also asserted that the MoE did not seek the teachers' opinions when deciding to make this change and that there was no training programme associated with it. One NST (DhTs) reported being "shocked at first when the MoE changed me from a chemistry teacher into a second-field teacher for grades 1-4. I tried to refuse, but had no option, but I still hope to go back to my specialty." Another referred to four different shocks that she had experienced during her first two years of teaching because of the MoE's recruitment and PD policies, namely the shock of change

to her specialization, to the age of her students and to the curriculum, in addition to that of being assigned to a remote rural school:

> *I was shocked that they appointed me to a Cycle 1 school. I wasn't sure how to deal with young students. I was to teach grade three and studied the subjects of science and mathematics. There was a big gap between my qualifications and teaching, because I had applied to work with senior students who would listen to what I was saying and who would be easy to manage and work with. Young students, because of their age, can't keep still in class and I find this hard to deal with. I also had a problem explaining maths to them. I'm a specialist in chemistry and didn't qualify as a maths teacher, but as a second field teacher I have to teach science and maths together. It's also bad that this year, the curriculum has changed to the Cambridge series, which I felt was unfair on the students, because the MoE didn't give us any training to help us understand these subjects. (SbTN)*

Her detailed response makes it clear that this novice science teacher was shocked by being offered no PD, despite having to change specializations and teach a different curriculum to younger children, and calls into question the success of the policy. The great majority of NSTs interviewed called for the MoE to have a clear training plan, especially for those for who had been obliged to change specialization, so that they could be rehabilitated and trained for two months before the start of the school year on the skills required for the age group that they would be teaching. They believed that this would be a good time for PDPs to commence because the teachers would not yet be burdened by a weekly teaching schedule.

Novice science teachers assigned to remote rural schools also spoke of the shock they experienced, especially as it differed from that of their colleagues in cities, in their case being required to teach at a higher level and with a heavy workload, as the only science specialists in their schools. In addition to teaching general science to grades 7-10, these NSTs complained of having to teach chemistry, physics and biology at grades 11 and 12, the highest grades in the Omani education system. They reported that this was a shockingly difficult experience because they did not have sufficient experience or time to prepare properly for it.

Five NSTs assigned to remote areas reported facing many difficulties, including those related to being far from their families, poor student motivation, the difficulty of accessing remote schools in mountains and deserts, the absence of fellow

science teachers from whom to seek advice and the rarity of visits by supervisors. The negative effects of such difficulties on teachers' performance and thus on student learning in these schools appears to have been compounded by the inadequacy of the professional development programmes offered to them. An NST described her experience in a remote school as follows:

> *I've pondered quite a lot about leaving the school because of the difficult circumstances that we experience every day in this school, but at the last moment, I always decide not to go through with it because I need this job. (DhTZ)*

Another novice teacher (MsTE) said, "These schools lack many educational services. The laboratory is broken, we're short of teaching aids and supervisors, and visits are very limited". A third NST cried when recounting how much she had suffered:

> *Because of this shock, I organised my time and benefited from it a lot. I gained a lot of experience. However, I hope the MoE takes into account novice teachers until they acquire the skills necessary to teach. Also, it should teach us how to acquire the scientific material, send us educational supervisors to train us and provide us with educational bulletins. (MsTH)*

Yet another novice assigned to a remote school was shocked by the poor environment; what surprised her in particular were the limited laboratory resources and the absence of a laboratory technician, so that the teacher had to both teach science and perform technical tasks in the laboratory, including preparing laboratory tools and conducting experiments.

Eight other NSTs indicated that they had also been shocked by the problems that they faced early in their career. However, their experience contrasted with those discussed above, because the head teachers and senior teachers concerned were aware of the importance of the stage that the novices were going through and therefore offered support that mitigated the shock. In particular, these senior and experienced colleagues were able to answer inquiries and support the NSTs with meetings, training, workshops and classroom visits.

A few policymakers and implementers acknowledged in their interviews being aware of the shock that novice science teachers faced upon being appointed to their first teaching post, taking into account that the Ministry's policy of recruiting NSTs in this way had been unchanged since 2011. Some policy implementers, however, noted that the central system, in terms both of appointments and of PD

provision, did not allow them to change this reality. One director-general of a governorate explained this issue as follows:

> *We need to pay better attention to new teachers and current graduates, because their thinking is not like ours when we were teachers. When I sat down with them, they told me that they felt as if they were aliens from another planet, because they had studied certain things and then were faced with another reality that clashed with this. Our vision for what the new teacher needs is still inadequate and needs due attention. All these things make the new teacher shocked by the reality he sees in schools when he finds how different it is, but unfortunately we are powerless to change it. (DoGA)*

In order for NSTs to overcome this shock, the MoE's PD policy should be effective and should meet the needs of all stakeholders. It is also important to take into account the needs of NSTs as they transition from pre-service preparation to employment by providing a range of PD mechanisms to suit the individual needs of teachers and the reality of their school environment. In addition, school principals, senior teachers and established teachers should be instructed to give priority to NSTs at the beginning of the school year, providing a timely induction programme and giving them the skills necessary to deal with the reality of the teaching profession. The next section discusses the MoE's new policy for the development of NSTs and assesses the extent to which their experience of the policy meets stakeholders' expectations.

7.3 The SIPTT and the new professional development policy

Chapter Five outlined the MoE's policy regarding the development of novice science teachers and its characteristics at various stages regarding the content of the programmes, where they were implemented and by whom. The current phase of ministerial PD policy is marked by the establishment at the MoE's headquarters of the Specialized Institute for the Professional Training of Teachers, dedicated to providing PDPs for all categories of teachers in a range of disciplines. One programme being offered to novice teachers in various disciplines at the SIPTT aims to "achieve a vision based on empowering the Omani teacher as an active partner in the development of the educational process, by employing the best teaching methods at international standards to achieve quality education" (MoE 2017, p.6). The Institute's website identifies eight goals, including contributing to "the preparation of a select group of

motivated and committed teachers" (MoE 2019). It currently has nine strategic training programmes, including the New Teachers' Programme, which is a one-year course consisting of four five-day training periods, targeting newly recruited Omani teachers in public schools. The overall aim of this programme is to help novice teachers become effective and creative users of new teaching methods that will improve learning opportunities for all students (MoE 2018a).

The first period of the programme introduces novice teachers to a global pedagogy and explores how to apply active learning strategies in class, then the second focuses on teaching higher-order thinking skills and investigative learning to account for individual differences between students and to create a stimulating learning environment by employing smartphone technology in the classroom. The third period provides an opportunity for novice teachers to focus on their subject areas and collaborate with subject teachers to apply active learning methods. The focus of the final period is on assessment strategies for learning, on the use of twenty-first century teaching skills, namely collaboration, communication and ICT literacy, and on teaching social and cultural competencies (including citizenship), creativity, critical thinking and problem-solving (MoE 2018a).

The SIPTT guide states that there are two aspects to assessment in the New Teachers' Programme. First, the novice teacher must deliver a file of completed tasks, including lesson plans and video clips of their teaching, at the end of each training period. Second, each novice must submit a written report of 500 words outlining the analytical, assessment and reflective thinking skills they have acquired during the training period, with evidence from their local classroom environment (MoE 2017).

The details of the PD plan for NSTs do not seem to be specified by the SIPTT. Thus, there is no statement as to what topics are included in the induction programme, the number of hours of training involved, the location of the programme, who the trainers are, whether the programme is compulsory, whether a trainee must successfully complete it as a condition of being employed as a teacher, or whether the Institute takes individual needs into account when planning the development of NSTs. Thus, stakeholders were questioned on these matters when interviewed for this study, in order to gain insight into the Ministry's

implementation of the new policy for the development of novice teachers in general and NSTs in particular. Also of interest was the impact of this experience on the learning and professional practice of the NSTs from the point of view of policymakers, implementers and the novices themselves. The following subsections address the extent to which the MoE has succeeded in the professional development of NSTs through the new policy of establishing the SIPTT, from the perspective of each stakeholder category.

7.3.1 Does the new policy work?

Policymakers and policy implementers were unanimous in the assessment that the programmes of the SIPTT had brought about a qualitative shift in the PD delivered by the MoE. This transformation, according to them, had had a significant impact on the application of teachers to the goals of the MoE in transforming learning to be student-centred, changing teaching methods from indoctrination and dialogue to inquiry and exploration. The strategic programme for novice teachers, now delivered to all newly recruited teachers in all disciplines, also includes continuous support provided by trainers via an electronic platform in addition to specific tasks in the work environment, which are then handed into to SIPTT trainers for evaluation and feedback.

A policymaker at the SIPTT (SCH) stated that its establishment and the design of its strategic programmes were prompted by Omani students' low scores in international tests such as TIMSS and the Programme for International Student Assessment. International studies carried out by the MoE in collaboration with the World Bank and the New Zealand Education Consortium have recommended that the MoE's policy on training both novice and experienced teachers be modified to ensure a fundamental change in teachers' performance (MoE 2017). A second SIPTT policymaker (SCB) pointed out another reason for establishing a strategic programme for novice teachers: "A large number of Omani novice teachers who have graduated from educational institutions outside Oman join the teaching profession at the MoE with poor teaching skills."

One of the centre's trainers (SCM) added that the design of the novice teacher programme modules had a global dimension, having been "designed in collaboration with the Centre for British Teachers, a world-renowned teacher-

training institution", the aim being to achieve "a high level of performance for teachers, enabling them to equip students with the skills necessary for global competition".

Most policymakers who participated in this study praised the positive results of the SIPTT's programmes in general and those for novice teachers specifically, stating that their implementation had resulted in NSTs adopting modern teaching strategies which had boosted students' motivation. One policymaker expressed this approval of the programmes as follows:

> *The impact of the programmes of the specialized centre, including the programmes for new teachers, has begun to pay off for the MoE. We've received reports from educational governorates that indicate a marked improvement in the performance of teachers in the classroom and increased motivation in classes using modern teaching methods and educational technology in classrooms. (HRM)*

One of the Institute's trainers gave this assessment of the impact of new teacher programmes on the learning and professional practices of NSTs:

> *When I visited some novice science teachers who joined the programmes, I was impressed by their performance and their ability to apply modern teaching strategies in class. I was pleased with the interaction of the students with their teachers and their desire to participate in class and interact with their teachers. (SCHM)*

A trainer on the NST programme concurred:

> *The feedback forms for the novice science teacher programme indicate the high level of satisfaction of teachers enrolled in the programme, as well as the positive feedback we received on the content of the training, training place, trainers and accommodations. (SCF)*

The above interview excerpts point to the satisfaction of policymakers with the success of the SIPTT's implementation of the training programme for NSTs in various educational governorates. To further investigate the extent to which its PDPs meet stakeholders' needs, in-depth evaluative studies are needed. Meanwhile, the great majority of policy implementers in the six governorates who participated in the present study confirmed the positive impact of the programmes on teachers in general and on novice teachers in particular. This was the view of the general manager of a governorate:

> *The training programmes at the specialized centre are qualitative and benefit novice teachers in integrating them better and faster in the educational process. They are also learning modern teaching strategies. (DoGA)*

An implementer from another governorate stated the following:

> *The specialized centre at the ministry provides an excellent training programme for all novice teachers in all specializations. What distinguishes this programme is that it is compulsory; therefore, the attendance of any novice teacher is mandatory. This programme is very useful for them because it depends not only on the theoretical side in terms of professional development but also on practical applications that serve the novice science teacher realistically. (DhTRM)*

One of the governorate's human resource development managers, responsible for the PD and teacher supervision programme, offered another positive appraisal:

> *Frankly, the specialized centre has proved its efficiency in aiding teachers, especially males. After joining the specialized programme, they are starting to apply modern teaching methods. Even though we were offering these to them before, they were telling us they had no time to implement them. Now that they are enrolled in the specialized centre's programme, novice teachers are beginning to apply these teaching methods and are encouraging their classmates to convey the impact of this training. (MsGA)*

A senior teacher praised the programme and its impact on NSTs from the perspective of the school:

> *When the teachers come back after a week at the centre, they're different. I notice that they have a variety of teaching strategies that we have not learned before and that they have the ability to employ them properly in the classroom. (DoHTN)*

Another senior teacher, from a school in a different governorate, also made a positive evaluation:

> *I feel that when the specialized centre opened, everything began to change and improve in the professional development programmes… The programmes of the centre are a great benefit not only for novice teachers but also for senior teachers and all schoolteachers […] We started little by little to get out of our routine and into something new […] Novice teachers at the school who had been on the programme showed an interest in using modern teaching methods which will benefit all schoolteachers in various disciplines. (MuHTS)*

The above responses by stakeholders of all kinds show that the professional development policy adopted by the SIPTT contributed to raising awareness among schoolteachers in the use of modern teaching methods in classrooms and that as the senior teachers reported, further important contributions were made by school exchange visits between NSTs and their fellow teachers, as well as through the PDPs offered by NSTs to their school colleagues.

7.3.2 Is the implementation of the new policy effective?

Despite the success of the MoE's policy on the professional development of NSTs and its impact on their learning and professional practice, policymakers and implementers differed in their opinions of its implementation. Chapter Five (Section 5.5.1.1) identified a number of MoE directorates concerned with the PD of NSTs, noting that overlapping and duplication among them made it difficult for the executive bodies in the educational governorates to implement the policy. In addition, governorates and schools which support NSTs must play other roles. Seven of the twelve policymakers in the MoE directorates referred to the weak integration of these roles, stating that since the establishment of the SIPTT, the responsibilities of the various directorates had become unclear. One policymaker stated the problem as follows:

> *The specialized centre did not inform the directorates of the ministry, the governorates and supervisors who follow up with the novice science teachers about what is included in the programme, what it contains and what their roles are. (HRF)*

A provincial training official said the following about the same problem:

> *We always demand a strategic plan for the professional development of novice teachers. The Department of Rehabilitation and Training, the Main Training Centre, the Specialized Training Centre, the Directorate of the Curriculum and the Directorate of Assessment are in the MoE, and there is no full coordination between the specialized centre and the other directorates in the ministry on the training of novice teachers. In fact, there is more than one hand to deal with. Therefore, we wonder what the roles of the main training centre, supervisors and schools are now. I think if the efforts were coordinated, the benefits would be greater. (DhHRM)*

The weak integration of roles between bodies concerned with the PD of teachers in general and NSTs in particular, especially after the establishment of the SIPTT, appears to be due mainly to the lack of clear functional terms of reference for the Institute. Its specialized documents and social media accounts were reviewed for this study, but no decision clarifying the roles of directorates and centres concerned with PD seems to have been outlined. Two officials at the SIPTT were also asked about these roles and their response was that the MoE would soon issue a clarification of the complementary roles of the SIPTT, the governorates and all MoE departments concerned with PD.

One of the educational supervisors concerned with the follow-up of NSTs in the governorates (SqSSa) described the SIPTT as “excellent”, but questioned whether its considerable cost had resulted in a “qualitative leap in the educational field”, suggesting that the training currently given to novice teachers was no more than they ought to have already received. Thus, he argued that empowering teachers with modern teaching methods and other skills was the responsibility of the universities and colleges engaged in teacher preparation, not the MoE as an employer. He concluded that teacher training in the Sultanate should be restructured so that teacher preparation institutions were more rigorous, allowing the MoE to be more selective in choosing whom to employ in the profession.

Regardless of the orientation of this supervisor, it represents a policy outlet for the ministry’s PDPs. Nearly 30% of policy implementers stated that they had not attended any programme at the SIPTT, nor received any introductory training on its functions. It may be concluded that their ignorance of the actual role of the Institute may have resulted in them adopting negative attitudes about the policy pursued by the MoE in the PD of NSTs. Therefore, the SIPTT should treat all educational supervisors in various disciplines, schools principals and senior teachers as active partners in the making and implementation of the MoE’s new policy on the PD of NSTs.

In Chapter Five (Section 5.5), it was mentioned that the MoE provides PDPs for novices who have been teaching for several months. In interviews, policy implementers were asked whether the SIPTT’s induction programme for novice science teachers was mandatory and if so, what would happen to teachers who refused to take part or who failed the final assessment. They explained that the novice teacher programme began as optional and then became compulsory. As to whether they saw it as satisfactory, implementers fell into two groups, the first of which described the policy as both successful and effective, while the second agreed on its success but noted the lack of strong evidence yet for its effectiveness. They also said that the MoE was currently working to create a professional licence to practice teaching in Oman, in order to ensure that novices attained high standards in their teaching, and that it planned in the future to grant the SIPTT the authority to issue such licences.

7.3.3 Does the new policy meet the needs of NSTs?

This section now turns to the data provided by NSTs themselves to answer the question of whether the MoE's new policy as implemented supports their professional development. The general finding is that the policy and its implementation do, at least in some respects, meet the PD needs of NSTs when first appointed to a teaching post. One of the sources of data on which this finding is based comprises responses to the second part of the questionnaire given by 399 NSTs from all eleven education governorates in Oman. Table 7.1 summarizes these responses using mean scores and standard deviations.

Table 7.1: NSTs' perceptions of central, Provincial and in-school PDPs

List of perceptions N 399	Mean*	Std. Deviation
The programmes offered to NSTs covered modern teaching methods.	4.60	0.79
NSTs need intensive training programmes in their early years of teaching.	4.54	0.72
The school principal only focuses on the administrative aspects of the NST, such as attending classes and completing records.	3.97	0.95
Trainers of NSTs are suitably qualified.	3.90	0.81
The list of training programmes that the NSTs attend in the first years of teaching includes the skills that teachers need at this stage.	3.89	0.96
The MoE directorates concerned show strong interest in developing the teaching skills of NSTs.	3.88	0.86
The senior teacher plays a major role in the development of NSTs' skills.	3.77	0.95
Training programmes offered to NSTs address the challenges they face.	3.69	0.82
Meetings of governorate officials with NSTs do not contribute to their PD.	3.68	0.83
The time allocated to training programmes for NSTs is adequate at this stage.	3.66	0.92
The educational supervisor provides NSTs with the necessary support for the teaching process.	3.63	0.80
The training programmes offered to NSTs do not meet their training needs.	3.62	0.82
The training programmes for NSTs offer a balance of theory and practice.	3.58	0.89
Training programmes offered in school focus on what NSTs should to do in the classroom.	3.45	0.88
The Ministry encourages NSTs' continual professional self-development.	3.40	0.87
Class-management skills are a prominent part of the training programmes offered to NSTs.	3:38	0.92
Training programmes offered to NSTs do not address the skills needed to perform science experiments.	3.05	1.11
Training programmes offered to NSTs are suitable for all grades they teach.	3.00	0.90
Training programmes for NSTs help them to develop disciplinary skills.	3.00	0.94
Training programmes offered to NSTs do not focus on the use of continuous formative assessment.	3.00	0.98
Governorate officials are interested in developing the skills of NSTs regularly.	2.90	0.88
Programmes offered to NSTs cover issues relating to the rights and duties of the teacher.	2.90	0.97
Opportunities for self-PD are widely available in the governorate.	2.84	0.84
NSTs benefit a lot from visits by the principal in terms of developing their skills.	2.80	0.84
NSTs are made aware of the training plan offered to them in their early years.	2.80	1.11
PDPs for NSTs are implemented at appropriate times.	2.70	0.87

* Mean scores are out of 5

Table 7.1 shows the experience of novice science teachers in the areas of professional development offered to them by the SIPTT, the provincial centres and schools. Their responses tended to produce moderate mean scores. It is also important to note from the table that the PDPs offered to NSTs focused on the topic of modern teaching methods, which received the highest scores on the itemized list of their reported experience of the MoE's PD policy. This finding is

consistent with that reported in Chapter Six (Section 6.3.3) concerning the topics that NSTs expected their PDPs to focus on; in particular, NSTs suggested in interviews that their induction programme should focus on modern teaching methods. Table 7.1 also shows that NSTs felt a strong need for intensive training programmes in the early years of teaching, a proposition which received the second highest score. This finding is consistent with the reference in Chapter Five (Section 5.3) to the MoE's interest in NSTs and their need for PDPs.

By contrast, the lowest score recorded in Table 7.1 is for the assertion that the implementation of PDPs for NSTs was appropriately scheduled. This finding is discussed later in this chapter, in Section 7.4.1. It is notable that five of the statements listed in the table as having received the lowest scores can be seen to relate to aspects of PDPs delivered to NSTs in their governorates and schools, indicating a perceived weakness of the PD programmes at these levels. The policy implementers in the governorates attributed this weakness to the existence of a specific programme for novice teachers offered at the SIPTT, located at the MoE headquarters.

In Chapter Three (Section 3.5) I distinguish between three groups of participating NSTs: those who had not yet enrolled in any training programme, whether in the SIPTT, the governorate or the school, those who had completed two phases of the programme provided by the SIPTT and who had two phases remaining to complete, and those who had completed the whole of that novice teacher programme.

Although the first group had not yet joined the programme and expected to be enrolled during the second half of the second semester, most of them were very enthusiastic about the programme. One novice science teacher who had not yet enrolled (DhTS) said, "I'm ready to join the programme, and I'm excited about attending, because from what I hear from my colleagues, it's very useful". Another NST made a similar response:

> *My colleagues told me that it was an excellent programme that I would benefit from a lot and that it was a lot of work but that I had to attend the New Teachers Programme, so I am excited to join it. (DoTA)*

An NST from another governorate was also looking forward to the experience:

> *I think that new teachers need more support to introduce strategies in the school. I am in a maze from the beginning, and I don't know what to do. Nobody told me what to do, how to start... I was hired on Thursday and I started work on Sunday, so I'm looking forward to any programme that helps me teach. (SbTMo)*

In contrast, some NSTs had not yet attended the programme and were not enthusiastic to enrol for several reasons, the most important of which were the timing of the programme and the tasks that would be assigned to them by the programme trainers. One teacher expressed her reluctance in terms of workload:

> *I've heard about the specialized centre, but I don't want to join it. My teaching load puts pressure on me, and I don't want to miss any lessons. The centre would be additional work, and I don't want it […] I hear the programme involves doing projects and tasks, and I feel that it will be a lot of pressure. If the programme was at the beginning of the year, I would certainly enrol in it, and I would only focus on the specialized programme. (MsTH)*

NSTs who had not yet enrolled in the PD programme, whether enthusiastic or not, had no knowledge of its nature or its aims. Furthermore, any information they did have about it, whether positive or negative, was obtained from colleagues. Therefore, the MoE and the educational governorates should be more effective in sensitizing NSTs about the importance of attending these programmes and their benefits for teachers, students and educational institutions.

The twenty NSTs who were attending the programme at the time of the interviews were asked about the extent of its impact on their professional practice. One of them responded:

> *I had great difficulties in the first semester, but after entering the New Teachers Programme in the specialized centre, these difficulties were greatly reduced, and the programme helped me address many issues. (MsTF)*

Another mentioned a number of skills he had acquired from the programme modules to date:

> *Currently, I am in the second year, and, alhamdulillah, I have succeeded in attending the MoE's programme in the specialized centre. The programme helped me a lot in learning teaching methods... I also benefited a lot in terms of dealing with students and some units in the curriculum, whether in physics or chemistry or biology, dealing with people with special needs and what should be considered at the beginning of the first week of teaching. (MsTK)*

In addition, 15 novice science teachers in the second year continuing to work on the modules emphasised the usefulness of the programme and its importance to

novice teachers, but criticised the procedures associated with its implementation, complaining of clashes with the teaching timetable, as this NST detailed:

> *The programme's implementation time and duration should be changed to not occur on actual teaching days. So far, 38 classes have been lost. I have delayed the curriculum for students. The programme is useful, though, and we enjoy it. It's been very interesting and not theoretical but practical. (MsTB)*

Another NST in this group raised two different issues:

> *As novice teachers, we need to know our rights and responsibilities, but the centre's specialized programme did not address these matters. … As for the submission of the tasks, they did not give us enough time. We started work this semester in mid-February, and we were required to hand in our work at the beginning of March. There was not enough time to do the assignments as required of us. (MsTF)*

Thus, problems with the programme's implementation that NSTs identified as requiring attention included their workload in meeting its requirements on time, the lack of clarification regarding the rights and duties of teachers as new government employees, and the timing of the programme. Since this last point was raised by all of the NSTs, it is addressed separately in Section 7.4.1 of this chapter.

The third group comprised twelve NSTs who had completed all modules of the novice teacher programme at the SIPTT. They therefore had more experience of implementing the new policy for the PD of NSTs and were better placed to assess the extent to which the policy could be said to meet the needs of NSTs as a whole. One such teacher gave the following strong endorsement:

> *I enrolled in the new teacher programme and I must say it was a real paradigm shift. Honestly, if I hadn't taken this programme, I would have needed many years to get to the level I am now. The programme was a qualitative leap in gaining experience. (DhTIB)*

Another NST described his experience very positively:

> *The specialized centre's programme helped me a lot. It played a great role, especially in the acquisition of teaching methods which I was unfamiliar with as a new teacher, such as methods of holding the attention of students in class and how to provide lessons, including several teaching methods, not only dialogue and discussion. I also learned how to employ active learning and how to develop activities that fit with each lesson. In addition, I learned how to use styles of play to draw students' attention and incorporate them in lessons. (MsTN)*

An NST from another governorate gave an equally positive account of her experience:

> *I took a programme in the specialized centre and benefited a lot. This generation is completely different from our generation and does not like indoctrination and dialogue. Students want new activities and different teaching methods. (MuTF)*

One NST (SbTMa) gave some details of the elements of the programme, saying that he had taken four training modules at the SIPTT at one unit per week and that he had found the third to be the most useful, because the first and second modules were general, targeting all novice teachers, whereas in the third module, "the trainer taught us how to use each of the modern teaching methods in science and linked the training unit to our specialty and to reality".

The programme offered by the SIPTT seems to focus on modern teaching methods and how to apply them. However, novice teachers also need training in areas such as class management, scientific material, evaluation methods, administrative tasks and their rights and duties. Four of the twelve NSTs who had completed the SIPTT programme objected to its content and implementation. One argued that the teaching methods presented were not suitable for 16 to 18-year-olds:

> *The specialized centre programme focuses on dealing with young students from 5 to 10 years of age, so it offers us games in the form of teaching methods and mechanisms, and we do not need this. We cannot use these games with grades 10, 11 and 12. Older students in grades 10, 11 and 12 are used to certain methods of teaching, so the methods offered by the specialist centre in this programme are not suitable for this age group. (MsTG)*

Another raised the question of professional self-development and appeared to be complaining of a lack of subtlety:

> *A novice teacher doesn't need to be pushed like this. As a teacher, he should develop himself. We need guidance, not information. The purpose of professional development is to provide you with a background in modern teaching methods and how to deal with students, but what you are offered in the programme can be learned by attitudes and practice. I don't need this programme in the way it was presented. (MuTA)*

A further criticism of the SIPTT's novice programme concerned the particular difficulties associated with teaching teenage boys:

> *The situation in schools has changed, but the specialist centre still follows old routines and believes that the problem for novice teachers is how to communicate information to students, but the truth is not exactly that. The problem in male schools, especially with older students, is how these students absorb all their ideas as their backgrounds change. Teenage students are affected more by the external environment than by the school environment. The facts and the subject*

> *haven't changed and the curriculum hasn't changed, so the senior teacher and our colleagues can explain to us out of experience. (SqTG)*

This teacher's suggestion was that PDPs offered by the MoE, including the novice programme at the SIPTT, should cover the special skills required to teach teenage students, especially in all-male schools. He was arguing that novice teachers need this skill more than knowledge about teaching strategies and scientific facts.

All of the NSTs participating in this study reported that the teachers' programme they had followed at the SIPTT was the only professional training they had received since joining the MoE as teachers. They also asserted that they had not enrolled in any other programme at the SIPTT or the provincial training centres. Four policy implementers from different governorates confirmed that they had stopped providing special training programmes for novice teachers in general, in response to instructions issued by the SIPTT. In answer to an open-ended questionnaire item asking to what extent their governorate training centre had met their training needs, 70% of participating NSTs replied that it had not done so; further research may be required to determine the underlying reasons for this.

7.4 Comparative analysis: Similarities and differences among stakeholder groups

Meeting stakeholder needs is an indicator of successful policy implementation and effectiveness. Therefore, any evaluation of the success of the PD policy for NSTs should take into account factors including the content of training programmes, the training map, the quality of trainers and the timing of the training, because they are prerequisites for the implementation of PDPs. These four topics emerged strongly from the responses of stakeholders regarding implementation of the policy on professional development for NSTs at the three levels of the SIPTT, the provincial training centres and the schools. The following subsections compare the responses of the three key stakeholder groups concerning these topics and reflects on similarities and differences between them.

7.4.1 The timely delivery of professional development initiatives

There was a divergence of views among stakeholders as to when PDPs should be implemented. All participating policymakers argued that the best time to offer PD provision to novice teachers would be a few months after they had begun teaching. More specifically, they believed that having been recruited, NSTs should begin working in their first school, where they would familiarize themselves with their peers, the students and the curriculum they were to teach. Only after teaching for a whole semester would they be likely to have encountered or become aware of the difficulties and obstacles that PDPs can address.

The policymakers presented a number of arguments in favour of this delay in beginning PD training, the first being that NSTs would have spent four years being trained in specialist teacher preparation institutes, where they would have acquired the necessary skills; and having graduated from these universities and colleges, they would have the ability to begin teaching. In contrast to this pre-service training, PDPs, including those for new teachers at the SIPTT, focus on the emerging aspects of the education system in Oman and can consequently be offered at any time during the school year. The second argument for delaying the induction programme for NSTs was that the MoE annually recruits more than 1,500 novice teachers in various disciplines, making it difficult for the SIPTT to train all of them at once, given the limited availability of facilities, premises, personnel and accommodation. Thirdly, policymakers cited SIPTT officials as explaining that for administrative reasons, the Directorate of Employment does not confirm the appointment of novice teachers, including NSTs, until the beginning of September, leaving no time for the SIPTT to implement an induction programme before they settle into their schools. A fourth argument for delaying the implementation of the induction programme for NSTs for a full semester after appointment was financial, as one policymaker explained:

> *Training this number of novice teachers needs a large financial budget and therefore we wait every year until the start of the new fiscal year in mid-January […] then we start training them at the beginning of March. (SCHm)*

It is notable that three of the four reasons given above were administrative in nature, reflecting the top-down approach to policy dissemination and implementation which the MoE takes to all of its activities. The impact of this

centralization of policy is not limited to administrative matters but extends well beyond to them, to students' learning time, as will become clear when the views of NSTs are analysed below.

It is also of note that I found no empirical justification, either in MoE documents or in interviews with policymakers, for delaying PDPs for NSTs. Specialists at the SIPTT or the provincial training centres appear to have conducted no tests to determine the training needs of novice teachers by measuring their existing knowledge or abilities. Moreover, NSTs are not involved in determining their own needs, all those interviewed having stated that their opinions were not sought when determining the content or timing of the PDPs offered to them.

In contrast to policymakers, NSTs expressed collective dissatisfaction with the timing of the SIPTT induction programme. In response to open-ended questions in the survey, 155 NSTs from all governorates referred to the need to determine the most appropriate time to deliver these PDPs. The interview data also reveal two main reasons why NSTs were not satisfied with their scheduling: First, as PDPs are delivered on school days, teachers miss a large number of lessons and find it difficult to compensate students for the teaching time lost; second, NSTs need the skills and knowledge of the modern teaching methods covered by the programme as soon as they are appointed to a teaching post, not six months after their appointment. Each of these objections is now examined in detail.

NSTs reported that the first PDP they had attended was held in the second semester on teaching days and had lasted a full week. Therefore, their students missed a week of science lessons and that part of the curriculum was lost or at best delayed, for two reasons. First, the experienced science teachers at the school, who were not participating in the PDP and who were therefore working as normal, were not available to cover the NSTs' classes because of their own heavy workload. Second, the standard practice of schools in the absence of any teacher for any reason is to have each of his lessons covered by a teacher of any discipline who happens to have no lesson of his own at that time, this colleague being required simply to sit with the students, without teaching. A number of NSTs referred to this problem. One said this:

> *Because I attended the new teacher's programme at the specialized centre, I lost 36 lessons in one semester. The problem is that no one can teach your curriculum when you attend a training programme. Therefore, when teachers return from training, they are required to rush through the curriculum to cover what was missed. Yes, the student has the right to learn and as a novice teacher, I have the right to attend a training programme. But the MoE has created a problem by failing to get a good balance between these two things. (MsTG)*

An NST from a different governorate (MsTK) acknowledged having benefited greatly from the SIPTT programme, "but the timing was not right for me. Going on the programme affected my delivery of the curriculum, because I lost 21 lessons". I also found one novice science teacher who had declined to attend the SIPTT programme because of fear of losing lessons, while others regretted being unable to attend PD sessions in school or at the governorate training centre for several reasons, including fear of losing lesson time. One of them said, "There are training workshops in the school but unfortunately, I haven't been able to attend because they conflict with the lesson schedule" (MuTA). It is evident that NSTs were concerned about delays in teaching the curriculum to students because of the lesson time lost to this training programme and other events. The inevitable negative consequences for NSTs and their students of this disruption mean that it is incumbent upon policymakers, implementers and school principals to take a fresh look at the timing of the implementation of PDPs.

The second reason cited by NSTs for considering the timing of the SIPTT's novice PDP to be inappropriate was that it came too late. A clear majority of NSTs emphasized that they needed the skills delivered by the programme before their first appointment, to enable them to make the right start in the teaching profession and to be more comfortable and confident. They also affirmed that having attended the programme, they had acquired science skills that they would have preferred to have prior to their appointment, because of their direct application to the lessons that they were required to teach in the first semester. One NST (DoHTT) put this point very bluntly: "After a full semester in the teaching profession, the trainer comes and gives us a workshop on how to present the first lesson to students! This makes no sense." Thirty NSTs agreed that the programme should be offered to them before the start of the school year, noting that it is called the *New* Teachers' Programme and asking why then it was not delivered to them until the last two months of their first year of teaching.

The policy implementers in the educational governorates agreed with the NSTs that the scheduling of the programme was not ideal, but asserted that there was no alternative. Moreover, implementers from the governorates of Dhofar and Musandam claimed that their schools suffered most from the implementation of the PDP on school days because their unfavourable geography meant that the schools were widely scattered, which, combined with the scarcity of graduates from these two governorates in the teaching sector, meant that they employed a disproportionate number of novice teachers. Thus, the schools in these two governorates were particularly heavily affected by the absence of NSTs during the implementation of PDPs. A director-general of one governorate described the impact of PD programmes on the delivery of the curriculum in these terms:

> *Yes, running training programmes during the school year affects the study plan, by reducing the number of learning days for the students. This is difficult for the teacher and the student, but there is no practical alternative, because these dates are specified by the specialized centre [...] Yes, we run some training programmes before the beginning of the school year, but unfortunately, they are not for novice teachers.*

This response raises two important issues: the impact of PDPs on students' learning time and professional development days.

Thirty two of the 45 NSTs who were interviewed agreed that the timing of the SIPTT's PD programme affected lesson time for the students, as each NST lost five working days per semester, which they were unable to compensate for later, obliging them to miss out a number of topics that should have been covered in lessons, or to teach them briefly and therefore superficially. Ten NSTs also indicated that under pressure from the school administration to cover the whole science curriculum, they had had to use lesson slots set aside for other subjects to make up for the lessons they had missed when attending the programme. Policymakers and implementers, however, believed that NSTs exaggerated the impact of PDPs on learning time, pointing out that the design of the curriculum plan took into account the absence of teachers from the school for PD or other reasons, allowing extra days in the timetable when teachers could make up for lost lessons. One of the policy implementers commented on this issue:

> *They're wrong to complain about the loss of learning time due to PD programmes. Yes, students' learning time is affected to some extent, but it's not affected as much as teachers claim. We're able to organize novice teachers' schedules in*

the weeks when PD programmes are running. We're experienced at doing this, so there's really no problem in this respect. (SqGS)

The second issue raised by policy implementers was the scheduling of PD days in the MoE's study plan. Ministerial Decision 92/2019 concerning the organization of study dates, exams and holidays for the academic year 2019/2020 specifies five days for PDPs before students begin lessons in the first semester and another five days between the two semesters. This policy has been in operation since 2005/2006, as indicated by the decisions made on dates of study at the MoE in those years, in order to provide teachers with specific skills in the field of teaching, to address educational issues or to discuss new developments in the educational system. All NSTs asserted that the appropriate times for scheduling PDPs would be during the week before the start of lessons in the first semester, after the end of the first semester exams and immediately before the end of the academic year. They demanded that these three periods be used for PDPs, rather than scheduling them to clash with lessons.

I agree with NSTs that the timing of the novice teacher programme offered by the SIPTT is inappropriate. Policymakers and implementers should find solutions to the administrative issues which currently delay the implementation of the programme for more than six months after the novices concerned have begun to teach in schools. I also agree with the demands of NSTs to invest these three PD periods in an orderly way so that they are best utilized, by designing PDPs to be delivered at the SIPTT, at the training centres in the governorates and in schools. These three periods are estimated to amount to 20 working days and are therefore sufficient to provide PDPs for NSTs and other teachers if properly planned and coordinated at the three levels.

7.4.2 The content of professional development programmes

A second major issue raised by stakeholders was the content of PDPs for novice science teachers; in other words, the topics that should be covered in the face-to-face training programmes for NSTs at the SIPTT, the provincial centres and in schools. The MoE documents indicate that the training of teachers should focus on three basic aspects: academic material, teaching methods and evaluation tools. In other words, teachers must receive training on subjects related to the

curriculum, on the use of modern methods to enable the content of the curriculum to be communicated to students in an interesting and understandable manner, and on how to use the tools of continuous formative evaluation to measure learning (MoE 2017).

Thirty-three NSTs criticized the SIPTT's NST programme as focusing too narrowly on one of these aspects of their work, namely modern teaching methods, with none of the four periods of the programme covering the curriculum and explaining its academic content. Given that in the 2017/2018 school year, the MoE began the application of the Cambridge Science and Mathematics Series as a new curriculum for grades 1-4, these participants found it inexplicable that the programme did not address this aspect of their work. Twenty NSTs also complained that the MoE had imposed a change of discipline on them, from teachers of physics, chemistry and biology to second-field teachers for grades 1-4, despite being aware that the preparation programmes they had undergone at university were inappropriate to prepare them for what they were now required to teach. Twelve of the 20 NSTs also reported that after the Ministry had transferred them from biology to a second field, they had difficulty in teaching mathematics to the third and fourth grades, because as specialists in teaching biology, they were unable to master the particular mathematical skills needed at this level. They therefore felt strongly that their training should include a clear explanation of the maths curriculum. A number of interviewees referred to NSTs' need for curriculum-focused training doses, especially since the 2017/18 school year had begun with the implementation of the Science and Mathematics Series in collaboration with Cambridge Press. These two extracts exemplify NSTs' objections:

> *I joined the New Teachers Programme at the Specialized Institute and it was useful and fun, but it doesn't touch the actual needs of the teacher in the subject he teaches. Instead, it focuses solely on teaching strategies. (SbTBd)*

> *The MoE changed my discipline from a biology teacher to a second-field teacher and to a different stage of students. The ministry should have given us additional training for two months before we started teaching to explain the maths and science curriculum as well as the skills of dealing with young learners. (SqTAi)*

In addition, NSTs said that they needed to receive training workshops on how to apply continuous formative assessment tools, nine of them claiming that they had

received no instruction on measurement and assessment during their undergraduate studies. Twenty-one NSTs also stated that the MoE had given them no training on how or when to use formative assessment tools, nor on the purpose of applying each of them. They argued that they and their fellow NSTs needed to master these skills, in light of the MoE's decision to apply the policy of continuous formative evaluation in various classes, as one NST explained:

> *I have not received any training in applying the assessment tools. I have been given an electronic template ready to use, but I don't know how to use it. There are assessment items for each tool, such as oral questions, short tests, homework and projects, but I don't know how to apply them and no one has given me any guidance on this (MsTF).*

On the other hand, nine policymakers, including three trainers at the SIPTT, stated that the main objective of the design of the New Teachers' Programme was to equip NSTs with modern teaching methods compatible with the MoE's orientations and objectives, such as investigation, exploration and problem-solving. They also asserted that the design of the programme was based on the recommendations of reports and studies carried out by the Ministry in the educational field. There was a general recognition among policymakers that not all skills needed by NSTs could be provided in a single training programme, so that officials at the SIPTT had to rely heavily for coverage of these topics on other PD resources available at governorate level, such as programmes run at provincial training centres, visits by science supervisors and the dissemination of guidance bulletins, in addition to school-level support for NSTs from senior teachers, colleagues and principals, as well as the content of the educational portal and the teachers' guide. Policymakers perceived all of these as valuable sources of PD content for NSTs.

A different perspective to that of the policymakers emerges from the interview responses of policy implementers in the educational governorates, all of whom agreed that they no longer provided any PDPs for novice teachers, including NSTs. They explained that these had been discontinued for several reasons, including that the SIPTT now offered a special programme for NSTs consistent with the vision adopted by the MoE, preventing them from offering another programme for the same category of trainee. A second reason given was that no funds were allocated at governorate level to implement a special programme for

novice teachers; nor were there adequate premises or specialized trainers at the provincial training centres to provide such a service. Finally, officials of the SIPTT had issued a notice prohibiting the provision of PD activities for novice teachers in the governorates without prior coordination and approval. Provincial implementers also agreed with participating NSTs that as the central programme was now the only one being offered to NSTs, it should include sufficient doses at this stage covering topics essential to the novice teacher, such as subject knowledge development (which should take priority), modern teaching methods and how to use continuous formative assessment tools, as well as short courses in the individual science subjects and in classroom management.

This divergence of perceptions among the stakeholder groups raises an important question: In light of the MoE's implementation of a new centralized policy for the professional development of NSTs, namely the establishment of the SIPTT, what role remains for provision at the decentralized levels, specifically via provincial training centres, educational supervisors, school principals and senior teachers? This question leads to a discussion in the next subsection of the overall strategic planning of PD provision.

7.4.3 The planning of professional development provision

No one doubts the importance of continuous PD as one of the mechanisms used by any institution to retain its employees on one hand and to inform them of what is new in their field of work on the other. The continuous PD strategy can only be achieved through a plan of PDPs provided to meet specific needs at specific times and delivered by professionals. Therefore, one of the principles behind the design of PDPs offered by the SIPTT, according to its official guide, is continuity (MoE 2018a). This means that the Institute aims to provide a series of PDPs offering the support that teachers need at various stages in their respective disciplines, which can be achieved only through a specific plan coordinating the contributions of PD providers at the three levels of the centre, the governorates and the schools.

I asked all stakeholders whether they believed that there was a plan for PDPs for NSTs, not in order to determine whether or not there was a plan, but to allow me to ask a series of follow-up questions that would elicit interviewees' perceptions

of the extent of integration and coordination of the three levels of provision of PD within a system centralized on the MoE and operated under a top-down approach.

All 45 NSTs interviewed responded that they had no knowledge of whether there was a PD plan for them, either at the SIPTT, their local training centre or their school. Indeed, 32 of them said that they did not know if any PD programme would be offered later at any of these venues, nor even whether there was any way for them to find out where or when such a programme would be implemented. Moreover, twenty-five of them reported that they had been told to go to Muscat to attend the NST programme at the SIPTT but had been given very short notice, in some cases just a day before the programme began. This had caused them to worry about organizing their classes, making family arrangements and planning the journey, which for some of them meant travelling 1000 kilometres from their workplace.

On the other hand, 12 of the 30 policy implementers interviewed across the six governorates reported that the training centre in each governorate had an annual training plan covering teachers of all subjects. They said that preparation of the plan involved the participation of a number of educational supervisors and novice teachers in each discipline and that the programmes targeted a number of teachers of each discipline in the governorate in accordance with the financial resources allocated by the MoE. A science supervisor in one governorate described the mechanism of preparing a PD plan for teachers in these words:

> *There is no clear training path for novice science teachers, but every fiscal year we meet and discuss annual reports of science teachers. Then, based on their results, we decide what training needs to include in the training plan for next year. (DhSH)*

All policy implementers involved in the study also agreed that the current provincial training centre plan included no programmes for NSTs or for novice teachers in general, explaining that three years earlier, responsibility for the PD of novice teachers had moved from the governorates to the central SIPTT, which now delivered all PDPs related to NSTs in all governorates of Oman. Thus, the role of the provincial training centres was limited to coordination between the

SIPTT and the novice teachers, informing them of the dates and venues of programmes affecting them.

Policy implementers in the governorates identified several challenges in designing an integrated training plan at the three levels (ministry, governorate and school), including the lack of a database of programmes offered to NSTs at any level. They also noted the absence of any record of PD allowing one to trace the career path of a particular teacher since initial appointment.

In contrast, policymakers, including officials and trainers at the SIPTT, affirmed that the Institute operated under a clear strategic plan covering PD provision of all kinds, including both short-term PDPs and strategic programmes for senior teachers, for experienced teachers and for school leaders and supervisors. One official explained that this plan would gradually replace the existing annual plans of the educational governorates, offering this justification of the change:

> *Prior to the establishment of the specialized centre, there were no professional development programmes offered in an orderly and planned manner, and there were large intervals between them. After the establishment of the specialized centre, the situation changed and these aspects became clearer. (SCB)*

An SIPTT trainer described the mechanism by which the Institute operates:

> *For example, in their first year, novice science teachers enrol in the New Teacher Programme at the specialist centre to learn some basic skills. After four years, they can join another programme at the centre called Subject Matter Experts. If they want to compete for the position of senior teacher of science, they must pass a special programme called Centre Partners […]. If they want to compete for the position of assistant headmaster, they must join a programme at the centre called School Leadership. This is part of the series and the strategy that the centre works on. (SCF).*

An official of the SIPTT also confirmed that the current phase focused on long-term strategic programmes intended to provide support for Ministry staff candidates for technical positions such as senior teacher, assistant headmaster or educational supervisor.

Despite the efforts of SIPTT officials in implementing the new policy, however, 80% of the provincial policy implementers still expressed ambiguity about the relationship between the Specialized Institute and the provincial training centres and their respective roles in the professional development of NSTs. There also appeared still to be a lack of clarity as to the role of the educational governorates

in delivering PDPs to NSTs and concerning the integrative relationship among the levels of centre, governorate and school in relation to these programmes. This uncertainty also applied to responsibility for support and follow-up after the PDPs, which is the subject of the final subsection.

7.4.4 Following up the impact of training

An important aspect of assessing the PD policy for novice science teachers is following up the effects of the training in order to evaluate the impact of the policy on the learning and practice of the teachers, thus providing a measure of the effective implementation and success of the policy. This section considers stakeholders' responses regarding the follow-up mechanisms used by the MoE to this purpose.

There was disagreement between policymakers at the SIPTT and policy executives in the educational governorates about the means used to track the impact of PDPs on NSTs. Their responses referred to two distinct mechanisms, the first being used by the SIPTT as part of the new central policy on the professional development of NSTs and the second operated by the governorates through educational supervisors, who usually implement and follow up PDPs at the same time.

An SIPTT trainer (SCF) explained that their follow-up procedure comprised three elements: application in the work environment, a field visit and a reflexive report. The first of these required the NST to produce a short video recording of the delivery of a lesson in the classroom, then to send it by email to the SIPTT, so that a trainer could evaluate the video and provide feedback to the teacher. This process would give the trainer an initial picture of how well the teacher was able to apply the knowledge and skills conveyed by the training. The second element, field visits by trainers to attend full lessons given by the NSTs in their schools, would provide more detailed information regarding their ability to do what they were trained to do. These visits would also provide an opportunity to offer any support that novice teachers need to perform the tasks assigned to them. Finally, NSTs were required to prepare a 500-word reflective report, in which they should demonstrate their skills in analysis, assessment and reflective thinking, with the requirement to link the report to their teaching work.

Several areas of doubt arise as to the effectiveness of this three-part procedure. It is not clear whether the trainers on the New Teacher Programme at the SIPTT would be able to visit all novice teachers in the eleven educational governorates, given that there are only 18 trainers on the programme and that they train more than 1,200 novice teachers in various disciplines, leaving them little time for field visits, let alone the assessment of videos and written reports in addition. Nor is it clear how effective this mechanism would be without the involvement of those responsible for the supervision of NSTs at governorate level, namely the science subject supervisors, senior teachers and school principals.

A trainer at a provincial centre reported that there was a different mechanism at governorate level for following up the effect of PDPs for NSTs:

> *Follow-up on professional development programmes for novice science teachers is carried out by supervisors, because they are involved in training novice science teachers, therefore they know these things and the supervisors can use their visits to monitor the impact of training and assess the extent to which teachers benefit from professional development programmes. (SqTRF)*

However, all of the supervisors from the six governorates who were interviewed disagreed with this account, claiming that they did not know what specific training the Specialized Institute delivered to NSTs, that they had not been informed of this policy, nor had they been directed to play the follow-up role in the governorates. This discrepancy indicates the existence of a problem in the interactions of supervisors in governorates with NSTs, as a result of the multiplicity of conflicting guidance which NSTs receive from SIPTT trainers on one hand and governorate-based supervisors on the other, who are responsible for their continuous supervision.

A final problem was revealed by the fact that 60% of the NSTs interviewed complained that principals and experienced teachers were unaware of the skills and tasks covered by the training offered at the SIPTT, resulting in poor facilities and support for NSTs by principals and senior teachers during implementation of the programme. Therefore, I believe that until the new policy achieves its goals effectively, all concerned in the governorates and schools should be involved in the policy and that their roles should be defined so that everyone knows what they need to do to implement it.

7.5 Stakeholder experiences and expectations as a basis for policy evaluation

Chapter Six provided a detailed explanation of stakeholders' expectations regarding PDPs for NSTs in three main areas: support from central and local training centres and schools, the main topics covered by the PDPs and support for NSTs during PDPs in the early years of teaching. Chapter Seven has completed the picture by examining the experiences of stakeholders in implementing the new policy.

In general, contradictions were found between expectations and experiences among stakeholders at all levels (policymakers, implementers and novice science teachers) regarding the policy on professional development programmes offered to NSTs. For example, NSTs expected that there would be great interest on the part of the Ministry, the governorates and the schools in providing them with PDPs in the first years of teaching on topics of importance to them, such as their rights and duties, the science subjects, modern teaching methods, student evaluation mechanisms and classroom management, but their experience was that they received no training support from the governorate centres or the schools. In addition, although the SITPP provided them with a qualitative PDP, its timing and contents did not meet their expectations or requirements.

There was also a contradiction regarding the training facilities available in the governorates, specifically the possibility of having a centre equipped with human resources and equipment, educational supervisors in all subjects and a budget for the implementation of PDPs, in addition to the existing capabilities in schools to support NSTs professionally in their early years. Policymakers expected these provisions to be an integral part of the MoE's new policy to support NSTs, because of the SITPP's limited capabilities to provide appropriate support to all NSTs in all governorates. However, the policy implementers in the governorates affirmed that they were not involved in planning and implementing these programmes and that there was no document specifying their own roles and responsibilities or those of the schools.

These discrepancies between stakeholders' expectations and experience form the basis for evaluating the new policy on NSTs' professional development, as discussed next in Chapter Eight.

7.6 Summary

This chapter has offered an analysis of the experience and perceptions of stakeholders with regard to the PD of novice science teachers. This analysis led me to investigate the effectiveness of the new policy by considering various aspects of its implementation and evaluation. Among the issues covered were the culture shock arising from the workload with which NSTs find themselves confronted at the outset of their teaching career.

The chapter has also discussed, from the perspective of stakeholders, three aspects of the new policy of delivering the PD of NSTs centrally through the SIPTT: whether the new policy works, whether it is being implemented effectively and whether it meets the needs of NSTs. A comparative analysis of stakeholders' perceptions of four topics has allowed me to identify similarities and differences among the three groups regarding the working of the new policy.

This analysis has revealed a number of issues that need to be studied and discussed more broadly. It has also enhanced our knowledge of PD provision for NSTs and of how to address the challenges faced by NSTs at the beginning of their teaching careers. Finally, it has considered the most appropriate ways to provide this PD content in the Omani context. These issues will be discussed in the next chapter.

Chapter 8
Discussion

8.1 Introduction

The discussion in this chapter can be seen to fall into two main parts. The first, comprising Sections 8.2 to 8.4, considers the three key contributions arising from the research findings with a focus on matters of particular significance to Oman. Thus, Section 8.2 discusses the uncertainty surrounding official Omani policy on the provision of professional development to novice science teachers in state schools, Section 8.3 examines a number of challenges and obstacles to that provision and Section 8.4 turns to the topic of professional learning communities in Omani schools. Section 8.5 then takes a broader perspective, discussing the overall contribution of the thesis to knowledge, theory and methodology, beyond what was already known from previous research. It also considers transferability and the borrowing and transfer of policy. The chapter ends with a summary.

8.2 Uncertainty on the professional development policy for NSTs

One of the main issues that have emerged from the findings of this study is the level of uncertainty surrounding the objectives of the official professional development policy. In other words, stakeholders perceived significant ambiguity and lack of clarity in the objectives, roles and implementation mechanisms of the policy for the provision of PD to NSTs. This uncertainty was not confined to the recipients of the policy, the NSTs themselves, but appeared to be common amongst policymakers and implementers, both at MoE headquarters and in the educational governorates, and as well as among officials of the Specialized Institute for the Professional Training of Teachers, which represents the apex of the new policy. This uncertainty was found to have a considerable impact on PD policy implementation within the Omani educational context, since unclear policy objectives may lead to ambiguity among stakeholders, who may consequently undertake actions unrelated to the planned policy or even in conflict with it.

The findings reveal eight threads of evidence demonstrating uncertainty over professional development policy in the context of this study. First, a thorough examination of official MoE documents, along with the stakeholders' views, has

uncovered a set of incompatible and sometimes conflicting views. This discrepancy is due to the lack of a clear common policy document on the mechanisms for the delivery of PD content to teachers employed by the Ministry in general, and to novice science teachers in particular. This situation was found to have continued with the establishment of the SIPTT in 2014 and to have persisted right through to the conducting of this study in 2018, despite the claims of participating officials of the Institute that it had based its policy on international standards for achieving high quality professional development services at the MoE.

The second piece of evidence is that the responses of both NSTs and policy implementers in the governorates indicate their belief that there is no policy document that clarifies the Ministry's objectives, nor a plan for the novice teachers' programme, and that this has led to a disparity in understanding among stakeholders of the new policy objectives, reflected in the implementation mechanism (see Chapter 5, Sections 5.5 and 5.6). In addition, the lack of a new MoE policy document on PD for NSTs is evident from stakeholders' responses regarding their experience of the effectiveness of policy implementation and demands for a strategic plan to develop novice science teachers (Chapter 7, Section 7.3.2). Moreover, the absence of a policy document outlining the goals and objectives for the development of novice science teachers has clouded the work of the training centres in the educational governorates (see Chapter 7, Section 7.4.3). This conclusion is consistent with the findings of the World Bank study, as well as the report of research jointly undertaken by the MoE and the New Zealand Education Consortium, which refers to the characteristics of the preparation of educational policies in the Sultanate of Oman (Chapter 5, Section 5.6).

Thirdly, despite the importance of a common understanding of public policy among the stakeholders responsible for guiding the various aspects of policy objectives and phases, there appears from the outset to have been a policy in Oman of limiting access to documents, as confirmed by the responses of several participants (see Chapter 5, Sections 5.5.2.3 and 5.6). Thus, it can be argued that a feature of the new policy is the restricted spread of knowledge of the policy itself, since the MoE seems not to have published its professional development

policy, either as a printed document or even on its websites. This made it difficult to gather sufficient information about the official Omani policy on the PD of NSTs, which had to be assembled piecemeal from a variety of sources, such as the Ministry's handbooks, memoranda, decisions, notes, previous studies, various presentations and feedback forms for trainers and trainees. The researcher was unable to identify any new policy document that was available in any of the governorates or the schools covered by the study. There was also reservation on the part of SIPTT officials to disclose any documents or plans relating to policy on the PD of teachers in general or of novice teachers in particular.

A related point is that in any context where a new education policy is being implemented, it is very important for stakeholders to have easy access to policy documents of various kinds, both on paper and in electronic form, in order for them to know and understand the policy objectives, expected outcomes and required actions of stakeholders at all levels. Indeed, such access is necessary for the successful attainment of long-term strategies and goals. In the Omani context, the preferred means of transmitting policy and instructions was found to be oral communication during meetings and informal gatherings of stakeholders at various levels, rather than written documents. This loosely regulated method of communication appears to have led to significant differences of interpretation of policy aims and processes among implementers in the six educational governorates. This illustrates the vital importance for the Omani Ministry of Education to produce and make accessible a unified public policy document on the professional development of NSTs, as well as of other categories of teachers, in order to ensure the success and effectiveness of the new PD policy.

The fifth finding revealing a degree of uncertainty over policy on NSTs' PD is that participating novice teachers clearly believed that there were two basic elements which were essential for them, namely a plan of implementation of PDPs and a document providing practical guidance for the various PD activities (see Chapter 7, Section 7.4.3). Novice science teachers need to know the timeline of the PDPs that will be offered to them, whether at the SIPTT, in the governorate training centres or within their schools, in order to prepare themselves psychologically, mentally and socially to participate in these programmes. In addition, NSTs require a guide to support their understanding of the objectives of such

programmes, the methods to be used, the expected results, the activities required, how they will be implemented and the methods of evaluating them. Clarity in these matters will help NSTs to be fully prepared to accept and understand the new PD policy and achieve its goals. In the field of the professional development of novice teachers, a policy document setting out the objectives and procedures may be of the utmost importance to policy implementers in the educational governorates and the directorates of the MoE's head office; however, the findings show that the policy is not clear to NSTs themselves. In the Omani context, the failure to provide NSTs with these tools is reflected in their uncertainty regarding the new PD policy.

Further evidence of the uncertainty surrounding the policy is that the novice teacher programme delivered centrally by the SIPTT to novice teachers of all subjects is the only programme that is documented in the written guide to SIPTT activities, which represents the MoE's new policy on PDPs for teachers in general and for NSTs in particular. However, there is no reference to the other PDPs, referred to in Chapters Two and Five, that are provided at the training centres in the governorates, nor any reference to the efforts of educational supervisors in supporting NSTs. Moreover, the role of the schools in the development of novice science teachers is not made clear in this policy, despite the efforts of principals, senior science teachers and colleagues, as well as the reported professional development days in schools and the regular weekly meetings for teachers of science subjects.

In the Omani context, the fact that PDPs for NSTs are delivered centrally by the SIPTT, while stakeholders at other levels lack any significant involvement in planning and implementing the relevant policy, has led to the exclusion of any meaningful role for governorates and schools. This centralization of influence and exclusion of the periphery is reflected in the means adopted by the SIPTT in the definition of its programmes. This became clear from the analysis of the Institute's only booklet, which includes a brief introduction to the programmes offered but does not mention the goals and objectives of each programme, nor the roles of the governorates and the schools in delivering them. Furthermore, this booklet makes no reference to any written professional development plan being adopted by the Institute for novice science teachers, nor to the roles of each of the three

levels. It is notable that the SIPTT has a presence on the MoE website, as well as dedicated Twitter and Facebook accounts, all of which are effective channels of communication and are regularly followed by teachers, yet the information delivered by all of these platforms is limited to news about the Institute and its events.

The seventh and final indication of policy uncertainty is the SIPTT's lack of collaboration with other bodies concerned with the professional development of NSTs at the same level. The study found clear evidence of weak coordination between the various arms of the General Office of the MoE involved in this area, such as the Department of Educational Supervision, the Directorate of Educational Assessment and the Directorate of Curriculum Development on one hand and the SIPTT on the other. The results indicate that there was no coordination among these bodies regarding the needs and requirements of NSTs for PD provision (see Chapter 5, Section 5.5).

There is no doubt that the integration of roles between the three levels and within the one level is a positive factor that would contribute to promoting the policy on the PD of NSTs in a coherent and consistent manner, by helping to avoid any unnecessary duplication or unwarranted variation in performance. Conversely, if provision at each of the three levels is planned and implemented independently and without conscious attention to the others, this will inevitably cause problems. This is one aspect of the uncertainty blighting the MoE's policy on the professional development of NSTs and it reflects the lack of coordination between the different bodies that implement the PDPs at the various levels.

The eighth and final indication of policy uncertainty at the SIPTT is the transferring and borrowing of policy on developing NSTs, specifically the adoption of a professional development programme from a Western university, translating its content and courses into Arabic, then implementing it in the Omani context. As reported in Chapter 2, Section 2.6.2, the MoE contracted with a Finnish university to provide content and programmes related to the in-service development of novice teachers. SIPTT officials confirmed that the MoE had used expertise from Finland to provide programmes for novice teachers including NSTs, because that country's education system was considered particularly advanced in the

professional development of teachers. One of the policymakers at the Ministry's headquarters indicated that caution should be exercised in transferring the contents of programmes implemented in countries that may differ radically in their needs and capabilities from those applicable in the Omani context.

The research discussed in this section has identified a number of uncertainties, including ambiguous objectives, unclear stakeholder roles and poorly defined mechanisms for the implementation of the policy in question and the reasons behind these weaknesses. Although this finding of uncertainty is based on evidence from the Omani context, it is very clear that these issues are not unique to Oman, but may also be found in other parts of the world. Indeed, similar problems have been identified elsewhere as needing to be taken fully into consideration in the implementation of all aspects of education policy, including the professional development of teachers. For example, Fullan (2007) asserts that clarity is one of the basic principles of educational policy and that ambiguity is concomitantly a challenge which, if not appropriately addressed, may lead to confusion in the implementation phase. More specifically, a lack of clarity is a problem in the implementation phase due to teachers and others being unclear as to what the declared goals of the policy mean in practice (Fullan 2007). Similarly, Adebowale, Dare and Research (2012) confirm that the awareness of politics is one of the most important factors affecting the MoE's success.

Brock and Grady (2007) also stress the importance of providing introductory guides to policy. This finding is consistent with research in Irish schools which concluded that teachers' participation in planning, content and documentation is of great importance in promoting positive results in science teaching and practice (Smith 2014).

Finally, the evident failure of the central authorities to involve other levels contradicts findings regarding reforms of the educational system, in that the participation of the three levels (school, district and state) is necessary in order to reform the system and enhance the permeability of the connection between the three levels (Fullan 2007a). Coordination among the stakeholders involved in any reform policy is important in order to achieve the desired objectives (Fullan 2007b; Al-Lamki 2009; Mertkan 2010; Akkary 2014). A study of the education

system in Oman concludes that one of the issues that should be addressed by the Ministry of Education is that of communication, coordination and interaction between the various directorates (Al Nabhani 2007).

8.3 Challenges and common obstacles to the professional development of novice science teachers

It can be claimed that the challenges involved in providing professional development programmes for novice science teachers is a somewhat neglected topic in the current literature. The evidence for this is that most studies that have investigated the challenges facing NSTs, or novice teachers in general, have focused on only two issues, namely the difficulties of the transition to the teaching profession and the challenges facing novices in the classroom. Such studies also assume that the PDPs that should be offered to novice science teachers are an effective tool to address or mitigate these challenges (Alhamad and Studies 2018; Bailey 2015; Dias-Lacy and Guirguis 2017; Gourneau 2014; Sali and Kecik 2018; Senom, Zakaria and Ahmad Shah 2013). In its discussion of the challenges faced by NSTs in the Omani context, the present study differs from these earlier ones in two main ways. First of all, it focuses more narrowly on the challenges that this category of teachers encounter in relation to professional development programmes, rather than the challenges facing them in their careers and professional practice more generally. Conversely, its scope is in one sense broader, in that it discusses not only the challenges affecting NSTs, but also the common challenges faced by the stakeholders in general, whether policymakers, policy implementers, or the NSTs themselves, with regard to the provision of their PDPs. In short, the challenges identified by this study are those that the various stakeholders encounter in delivering professional development programmes to NSTs.

The findings of this study have revealed several such challenges. In order to structure the discussion of these diverse issues, the three following subsections highlight in turn three cross-cutting issues, chosen because of their importance in the Omani context in light of the implementation of the new PD policy. These issues, to be discussed here in detail, are the challenges related to subject knowledge development, administrative problems accompanying the

implementation of the new policy, and support during the early years of a novice science teacher's career.

8.3.1 Challenges to subject knowledge development

A major area of challenge identified by participants in the study, the importance of which is deducible from the amount of time given to it in the interview responses of all classes of stakeholders involved and in NSTs' answers to the open-ended questionnaire items, is the perceived insufficient attention given to the development of novices' subject knowledge (see Chapter 6, Sections 6.3, 6.3.2 and 6.3.3 and Chapter 7, Section 7.4.2).

It can be argued that the inadequate knowledge of their subject among novice science teachers is the most prominent challenge which is currently being ignored by the MoE's new PD policy. The findings indicate the existence of four factors which together have led to the emergence of this undesirable state of affairs. The first is the poor coordination between the MoE, which employs science teachers, and the Ministry of Higher Education, which is responsible for their pre-service preparation. This has meant that neither of these ministries appears to have addressed a weakness in teachers' preparation in terms of subject knowledge development arising from differences between the study plans followed by graduates of teacher preparation institutions in Oman, whether public or private, on one hand and of those graduating from institutions outside Oman on the other. These institutions were described as offering little detailed instruction in subject knowledge to candidates for MoE teaching positions. The second reason for an apparently widening gap in knowledge of the subject was found to be the Ministry's policy of obliging graduates of physics, chemistry and biology, who had planned and been expected to teach these individual science subjects to older students, to take up posts as second-field teachers of general science and mathematics to students of grades 1 to 4, without any training to compensate for their consequent lack of subject knowledge. Conversely, there was found to be a policy of requiring first-year novice science teachers to teach students in grades 11 and 12, despite deficiencies in their knowledge of the subject and their lack of experience, which was another significant aspect of this challenge. The fourth factor is that both policy implementers in the governorates and novice science

teachers themselves expected, with some justification, that any introductory programme offered to NSTs should include a large element of knowledge of the subject matter, whereas in reality the programme offered by the SIPTT did not include such an element.

In the Omani context, these factors have caused stakeholders to be confronted by the major challenge of the inability of the new policy for the provision of PDPs to novice science teachers to address this fundamental shortcoming in terms of subject knowledge. This was found to be reflected in NSTs' inability to teach some of the curriculum modules, while policymakers and implementers alike were unable to provide appropriate novice teacher development interventions without creating an unduly excessive workload for NSTs. Other studies set in Oman, investigating programmes of teacher development on one hand and teacher preparation on the other, have also identified the existence of such a challenge and have underlined the importance of a clear plan being drawn up for the Ministry to address the lack of subject knowledge in the PD content of novice teachers (Al-Lamki 2009; MoE 2012; Al Shabibi 2013).

Studies in other settings have shown that this problem is not limited to the Omani context, but that the education systems in a number of other countries can be seen to face similar challenges. In this way, the findings of the present study are consistent with those of Farrell (2012), in that there are gaps between the content of teacher education and the reality of teaching in schools. They are also in congruence with the findings of Werbińska (2011), who investigated the perceptions of novice teachers in the early years of teaching in Poland. Some study participants claimed that teacher education was not practical enough to prepare teachers to solve related problems. In addition, the need for the further development of teachers in academic knowledge, relating to their teaching subject, is referred to by many studies in the literature, conducted in a number of different countries (e.g. Furness 2008; Iwamura 2008; Veenman 1984), which underlines the importance of addressing this need by means of professional development programmes during the early years. For example, in the context of English education, the challenges of developing a knowledge of the subject are the subject of the first recommendations of a report by Carter (2015), which reviews the early training of teachers and stresses the need to address this

challenge, noting how difficult it would be to cover the requisite breadth of knowledge in a one-year programme. Carter (2015) also recommends that the government adopt a number of mechanisms to facilitate the meeting of this challenge.

The present study concludes that addressing the weakness of NSTs' subject knowledge should not be limited to induction programmes, but should be maintained in continuing professional development programmes throughout at least the first three years that a teacher spends in the profession. It is also important that the need for subject knowledge be addressed systematically for all stages involving novice science teachers, whether in Cycle One (primary school), Cycle Two (secondary school), or in grades 11 and 12 (sixth form college), and for all subjects. It should be borne in mind that this study has found that science and maths teachers in Cycle One lack subject knowledge to a greater extent than other science teachers. This result is consistent with the findings of Carter (2015) and Watson (2006).

8.3.2 Administrative problems in the implementation of the new policy

This study has identified many administrative problems that stakeholders face in relation to the PD of novice science teachers (see Chapter 5, Section 5.4). These have contributed directly to the failure to provide PDPs that are adequate in helping to alleviate the shock that NSTs experience when they start out in their teaching careers (see Chapter 7, Section 7.2).

This study has referred to several administrative problems from the viewpoint of the stakeholders in professional development departments, which impede the delivery and follow-up of PDPs. However, this subsection of the study will discuss only the two most significant management problems that have arisen from the evidence provided by all stakeholders in relation to the PDPs offered to novice science teachers: workplace context and workload. This study uses the term 'workplace context' to refer primarily to the location of the school where the novice science teacher works. As to 'workload', this means all of the teaching and non-teaching tasks that NSTs are required to undertake.

In Oman, the workplace context was found to have had a significant impact on the professional development of novice science teachers for the following

reasons: First, two-thirds of NSTs were assigned to schools in areas far from their homes, with some of these being sent to particularly remote areas of the Sultanate. This is a contextual factor that is seen as a challenge not only from the perspective of novice science teachers themselves, but also by other stakeholders, namely both policymakers in the MoE's directorates and policy implementers in the educational governorates (See Chapter 5, Section 5.4.1).

NSTs sent to remote schools appeared to perceive the areas where they were teaching as contexts different from where they lived and from where they graduated, which made them feel that they needed to invest significant time and effort in learning about, understanding and acclimatizing themselves to the new culture. A number of female teachers who had been assigned to work in mountainous regions of the Sultanate reported in interview that it had taken them a long period of time to understand the local dialect spoken by the students. These teachers were also concerned that the culture of work in these schools was different from that of the schools in which they were trained before graduation. Participating policymakers recognized this issue of dislocation and considered it to constitute a major challenge for the Ministry, imposed by the priorities of the appointment of Omani teachers to schools in these parts of the country, because of the shortage of science subject graduates originating from remote areas. Policy implementers agreed with this analysis and noted that such remote schools where NSTs are hired tend to lack many professional development facilities, such as the presence of experienced colleagues to mentor and support new teachers (See Chapter 6, Sections 6.4.3 and Chapter 7, Section 7.2). A case study of four novices English teachers in Oman conducted by Al Shabibi (2013) concluded that the recruitment of these teachers in remote areas had delayed their adaptation to the new environment, as it took a long period of time for them to understand the new culture.

The second way in which workplace context can be seen as having had an effect on the PD of novice science teachers concerns the lack of awareness among new recruits to schools in remote areas of the policies, rules and unwritten standards applicable there. At the same time, the relatively small numbers of teachers in each of these schools means that all members of staff, including novice teachers, are likely to have to fulfil more than one role each, including

carrying out administrative work unrelated to teaching. All of these issues put NSTs in complex situations which in turn will tend to influence their relationships with schools principals on one hand, while on the other making them less willing to attend vocational development programmes at the governorate training centre or at the MoE because of the long distances that they will have to travel and the amount of time having to be taken out of the school day.

Therefore, it is essential that the MoE has an awareness of the novice science teachers in the context of working in schools, before distributing them to the areas where they will be appointed, or that the educational governorate plays this role before allocating teachers to these schools. NSTs should also be provided with brochures and leaflets by the MoE in order to help them to adapt to the job and the new environment, as well as providing website links to teachers during this period, and direct lines of communication, in case of any inquiry or need for assistance. Emphasis should be placed on the pivotal role of the school community in receiving new members of staff, who should be treated during their transitional period in a manner that contributes to facilitating their integration and the progressive strengthening of their familiarity with the context and rules of the school. In addition, PDPs must be offered in planned and deliberate ways. All of these measures will serve to engage NSTs more deeply in the new school community.

In fact, this challenge is not specific to the Omani context, as many studies set elsewhere in the world indicate that the location and context of the workplace can have an impact on novice teachers and a number of such studies have found that context significantly influenced their initial experience (Farrell 2006; Iwamura 2008; Mann 2008; Watson 2006; Windschitl et al. 2008). The findings of the current study are consistent with those of Schmidt (2008), who found that in Canada some new teachers attribute their limitations in adapting to the new work context to their poor knowledge of its unfamiliar workplace culture. Similarly, Kim and Roth (2011) note that school traditions can be controlled through unwritten information and that it is therefore difficult for novice teachers to come to terms with the full details of such traditions in the early stages of their employment.

Other researchers have focused on the more formal organizational and administrative aspects of this issue when discussing the challenges facing novice teachers in the workplace context. Thus, Sabar (2004) argues that these challenges stem from the inability of new teachers to adapt to their school's organizational standards. Each school has a list of rules and working mechanisms in place when novice science teachers join them (Scherff 2008). It is therefore reasonable to expect that NSTs should be fully informed of these rules by the principal, as part of their professional development, in order to help them adapt to the school's particular organizational standards.

The second administrative issue identified in the Omani context by the present study is that of novice science teachers' workload, both in the classroom and outside it, whether or not directly related to teaching itself. Stakeholders of all kinds gave interview responses indicating their belief that too great a workload imposed on NSTs has negative effects, including stress and fatigue, which undoubtedly limit or impair their engagement with professional development programmes. The study found evidence of a number of interrelated factors underlying the excessive workload of novice science teachers. First, they are obliged to take on some of the administrative work of the school, such as the management and organization of extracurricular student activities, supervising students on school buses, monitoring them during break periods and offering them informal guidance. They also have to cover the classes of colleagues who for one reason or another are absent from school. Finally, according to some of the participating policymakers and implementers, the difficult financial situation in which the government has found itself has resulted, since 2015, in a policy on the part of the MoE of raising weekly teaching quotas, thus contributing to an increased workload for teachers in general, including NSTs.

The net result of these combined factors has been a marked reduction in the time available for NSTs to attend professional development programmes, whether inside or outside their schools, bearing in mind that the MoE's policy requires the implementation of PDPs to take place during official working hours, regardless of whether these programmes are implemented centrally by the SIPTT, at the governorate training centres, or in the schools.

In the Omani context, it can be argued that the problem of workload is caused by a lack of time management skills among NSTs, rather than by the large number of activities that they are obliged to undertake, as participating novice teachers themselves suggested, or indeed by the above-mentioned increase in weekly teaching load for all teachers, as policymakers and implementers asserted. Evidence for this analysis is provided by a study recently conducted jointly by the MoE and the New Zealand Education Consortium, which found that science teachers in the Sultanate, including NSTs, were required to teach a weekly average of 15 to 16 lessons in a timetable which would theoretically accommodate a total of as much as 40 lessons per week (MoE 2017). When the novice science teachers involved in the current study were all interrogated on this matter, no teacher was found to have a weekly workload exceeding 20 weekly classes. This suggests that NSTs in Omani schools have to teach for only 50 per cent of their time in school, leaving the other half of their working week potentially free to be dedicated to non-teaching activities such as PD, within or outside the school.

However, a number of participating NSTs claimed that they found themselves spending a long time in preparing their lessons and that they were unable to finish the lessons and units on time. They also reported that many of their practical experiments failed to have the required results and that the principal and supervisor therefore tended to admonish them because of the consequent delays in their lesson planning. They further claimed that most of their school administration work was carried out at home, in the evening or at weekends, in their own time. It can nevertheless be argued that their perceptions of an excessive workload arise more from their inability to manage time than from a high number of extra-curricular student activities or from the increased number of weekly lessons.

The workload issue for teachers in general, and for novices in particular, has been mentioned by many studies in many different contexts, which indicate that excessive workload at the beginning of the school year is the reason that novice teachers are unable to think about teaching. This is illustrated by the results of a three-year study of 35 novice science teachers in Hong Kong conducted by So and Watkins (2005). In another longitudinal study, this one lasting two years and

involving five novice English teachers, two of the participants complained about the many extra-curricular activities in which they were obliged to take part (Urmston and Pennington 2008). A study by Shoffner (2011) also found that workload was one of the six major anxieties of novice teachers in high schools in the Midwestern United States, in the early stages of their teaching careers. Yet another longitudinal study, performed in China by Young (2014), had similar results, reporting that two of the four participating teachers had resigned, giving as their reason for doing so the stress of the different teaching tasks and of the overall workload.

Indeed, there is a significant body of international literature indicating that the workload of novice teachers is a major area of concern during their first year of teaching and that it is one of the reasons for some of them to leave the profession prematurely, while an important factor tending to alleviate the consequent high attrition rates is the provisions of adequate PDPs, especially induction programmes (Darling-Hammond 2006; Dias-Lacy and Guirguis 2017; Fantilli and McDougall 2009; Goldrick 2016; Ko et al. 2000; Kozikoglu 2017; McCann and Johannessen 2004; Meister and Melnick 2003).

In contrast, Beck, Kosnik and Rowsell (2007), Farrell (2012), Poth (2012) and Varela and Maxwell (2015) emphasize the finding that teacher induction and preparation programmes are insufficient for linking theory with practice and that novice teachers therefore find it difficult to balance classroom management and their workloads with survival, performance and improved teaching practice and student learning.

As for the issue of time management for NSTs, this finding is consistent with a contention that is widespread in the literature, namely that poor time management is the biggest challenge facing novice teachers at the beginning of their teaching careers (Mann 2008; Urmston and Pennington 2008). In a report on initial teacher training in the British context, Carter (2015) argues that it is essential for initial training programmes for novice teachers to include explicit material on flexibility and time management, which I consider particularly important in the early part of a teacher's professional life. He also asserts that endowing novice teachers with robust time management skills puts them in a realistic position to understand the

demands of their workload and manage it accordingly. Finally, he contends that they should be provided with practical strategies for smart working and for maintaining an appropriate work-life balance.

Discussing this issue requires stakeholders to think about incorporating some non-teaching skills such as those of time management into the preparation and introduction programmes which are provided for novice teachers. Time management skills are just as important as a firm grasp of current teaching methods, knowledge of the subject and classroom management skills.

8.3.3 Support during the early years of employment

One of the most important contributing factors to the ability of novice teachers to adapt well to the learning environment is meeting their need for practical and emotional support in the early years of their careers (Sabar 2004; Chubbuck et al. 2001). In the Omani context, although policymakers and implementers claimed that novice teachers have many resources in the form of both internal and external support, it can be argued that these resources lack the planning, organization and complementarity among themselves to achieve their goals. A major challenge facing stakeholders was therefore found to be the difficulty in determining how to invest the sources of external and internal support that exist in the Omani context in order to enable novice science teachers to thrive in their demanding early years in the teaching profession (see Chapter 7, Section 7.4.4).

The central issue addressed by this thesis is the support given to NSTs during those early years. According to policymakers participating in the study, novice science teachers who have been recently appointed are provided with both external and internal sources of support, in other words, from outside the school as well as within it (see Chapter 5, Section 5.5). The external sources include the induction programme delivered by the SIPTT, in addition to what is offered to NSTs at the level of the governorates, whether in the provincial training centres, through periodic supervisory visits, or in printed bulletins. According to Weiss (1999), support at district and state level is necessary to ensure that systematic structural changes are made in the teaching profession in order to create an environment that responds to novice teachers.

In the Omani context, the educational governorate has completely ceased to provide any introductory programmes for novice science teachers, or indeed for novice teachers of any other subjects. The reason for this, according to the officials in the educational governorates, is that this role has shifted to the SIPTT, affiliated with the Ministry, and that the SIPTT now offers its four-session New Teacher Programme (NTP), which is delivered six months after the novice science teacher starts practicing, having been engaged with a full contract. Importantly, the NTP is considered to be an induction programme and is not mandatory, as is the case in some contexts, such as Chile (Avalos and Aylwin 2007), Hong Kong (Mann and Tang 2012) and Korea (Shin 2012).

The NTP offered in the Omani context also lacks set programme requirements, such as linking the successful completion of the induction programme to obtaining a professional licence (Goldrick et al. 2012). In addition, there must be a clear understanding of the expectations of the programme by the induction team (novice teacher, senior teacher, educational supervisor, school principal and provincial official), which means that each member of the team must clearly understand the expectations associated with the programme, as well as the roles and responsibilities that each of them has in its delivery (Humphrey et al. 2008; Kapadia, Coca and Easton 2007; Wechsler et al. 2010).This requirement notably does not apply to the programme operated in the Omani context. The evidence for this is that not all of the above categories of stakeholder have been involved in planning the NTP, nor have the skills which the programme is intended to deliver to the novice teachers been adequately defined; therefore, those involved cannot provide NSTs with the support and feedback they may need in relation to the training provided by the SIPTT.

Moreover, the educational supervisors for the science subjects in the governorates, who represent the second external source of support for NSTs, have limited roles, especially in the more remote areas. While they might be expected to have a role in providing information, ideas and solutions to the problems facing novice science teachers, the results of this study have revealed that their visits are limited (see Chapter 7, Section 7.4.4). NSTs complained of the inadequacy of supervisor classroom visits and a lack of support, but this study has not found any strong evidence concerning the effectiveness of supervisory

visits from outside the school. However, it is clear that regular supervisor support is required for NSTs at the start of their appointment, especially in remote schools and in those where there are no senior science teachers in post. The support of external supervision is important in Oman, according to the participating policymakers and implementers, but none was observed in the schools visited. This finding is consistent with a study conducted in Chile by Avalos and Aylwin (2007), in which the majority of participants reported that they received no support from external supervision during their first academic year of teaching. Likewise, a study conducted in Norway highlighted the need for NSTs to be further supported by external supervision and follow-up, not only at the beginning of the school year but throughout it (Ulvik, Smith and Helleve 2009).

Sources of internal support provided to novice science teachers in schools in Oman are of even greater importance than they would otherwise be, in light of the limited external support available. In the Omani education system, internal support for NSTs relies theoretically on three sources within the school: the principal, the senior teacher and teaching colleagues. However, there is no specific reference in MoE documents to the relationships between these three parties and NSTs. In the official job descriptions setting out the roles and responsibilities of principals, senior teachers and experienced teachers, there is no indication of the support that these higher-ranking colleagues should provide to the novice teachers in their schools. Rather, these job descriptions focus mainly on the technical support that the principal, the first teacher and other experienced teachers are expected to provide to all teachers in general, without allocating any particular provision to novice teachers and without specific reference to their status as needing full support during their early weeks and months as teachers. This situation was reflected in the reality of the observed practices of the principals, first teachers and experienced teachers in their dealings with the novice teachers in their schools.

Novice science teachers participating in this study stated that school principals were very busy with their administrative work and did not have time to sit with them, so that they would usually refer NSTs to a senior teacher at the beginning of the school year, without providing any level of support themselves, although some NSTs did express their appreciation for the help and guidance that they

had received from principals at the start of their appointment (see Chapter 7, Section 7.3.3). These findings are consistent with those of a study by Kardos et al. (2001), the results of which varied between support from school principals that met the expectations of novice teachers on one hand and the disappointing behaviour of some principals on the other, regarding the role that they would be expected to play in developing professional culture and ensuring successful induction programmes for novice teachers. I would argue, as an insider in the Omani system, that the absence of a clear statement of roles and responsibilities appears to have led school principals to believe that the senior teacher in a school is responsible for all educational aspects of the support to be provided to both experienced and novice teachers. This belief is reinforced by the fact that the new policy on the professional development of novice science teachers disregards the role of internal sources of support for NSTs in schools.

In addition, the literature emphasizes the primary importance of having a colleague with experience to support novice teachers as they seek to become established in their careers (Ingersoll and Smith 2004; Kardos et al. 2001; Weiss 1999). However, one of the challenges associated with this aspect of support lies in the fact that many schools in Oman, especially the more remote ones to which novice teachers are often appointed, do not have senior teachers in place who can provide the support that science teachers need when taking up their first appointment to a teaching post. As for those schools which do have senior science teachers in place, they tend to treat NSTs in the same way as the generality of science teachers, because there is no official mentoring system in Oman, nor any specific policy on ways of providing support to novice colleagues. Weiss (1999) concludes that collaboration between novice teachers and experienced ones in mentoring programmes improves the effectiveness of the novices and reduces rates of attrition among teachers. In a more recent study, Lambson (2010) also emphasizes the active role of the experienced teacher as facilitator. It can be asserted that this role is considered to be successful if it provides both theoretical knowledge and realistic practice for novice science teachers.

Moreover, all of the novice science teachers taking part in the present study agreed on the valuable role of colleagues as an informal source of support. Over

time, this type of support, from colleagues both within and outside the school, has become more important among NSTs. In line with these findings, a participant in a study by Borg (2008) explained that she was fortunate to have the support of fellow teachers with whom she shared ideas and experiences. This is further corroborated by the finding of Al Shabibi (2013) that the four novice English teachers in her study treated their classmates as critical friends who trained and guided them in a non-judgmental manner. In the Omani context, peer monitoring in schools was found to be one of the best ways to obtain support, but such opportunities were limited by the busy weekly work schedule and a lack of willingness among some colleagues to accept this type of support. Here, the challenge arises around the failure of the school administration, or the senior teachers, to become involved in arranging the weekly schedules in order to foster this important source of support.

This discussion of internal sources of support for novice science teachers within the school leads to the consideration of the school as a unit for professional development and as a locus of professional learning communities, which will be the focus of the next section.

8.4 Professional Learning Communities in Omani Schools

Elmore (2004) asserts that each teacher must learn how to teach in whatever setting he or she works in, referring here to the school. Education policy change occurs within a tripartite model consisting of school, county and state levels, according to Fullan (2009), who stresses the need for systematic change within all three levels. In the Omani context, the three levels are respectively those of the school, the governorate and the Sultanate, in other words, the central level of the MoE.

The findings of the present study show that the policy of developing novice science teachers in the Omani context is managed in terms of planning and implementation, from top to bottom, in order to support and empower novice teachers with the necessary teaching skills. It has also been shown that this policy does not consider building the capabilities of people at the intermediate and local levels (those of the governorate and the school) to achieve what Fullan calls a systemic change within the triple-level model. Consequently, the necessary

support has not been provided for training the policy implementers in the governorates and schools to effect the proposed changes, leading on one hand to school administrators being resistant to allowing NSTs to attend training events and on the other to senior teachers in schools being unable to provide support and follow-up to the training provided to NSTs by programmes at the SIPTT.

This top-down model, which fails to exploit valuable resources at the local level, has been adopted despite a growing international interest in induction activities for novice teachers in schools, as well as widespread support for the practice of recruiting experienced teachers to work with novice teachers and for the development of professional learning communities in schools. Indeed, the creation and nurturing of PLCs has become a hot topic in many countries because of their proven positive impact on raising standards in schools by building stakeholders' capacity for sustainable improvement (Andrews and Martin 2003; Carver and Feiman-Nemser 2009; DuFour, DuFour and Eaker 2008; DuFour 2004; Ibrahim 2012; Lee, Feng and Tutoring 2007; Stoll et al. 2006). In contrast to this growing body of evidence, the findings obtained from this study show that those responsible for education policy in Oman appear to be unpersuaded of the value of PLCs in contributing to the preparation and delivery of in-school induction programmes that would help novice science teachers to adapt to their new workplace, with the aim of improving their learning and thus the quality of their teaching. It can be said that the policy on the professional development and mentoring of NSTs pursued by the MoE in Oman remains wedded to the centrally directed and delivered model of face-to-face training, without regard to the importance of other induction activities which should be offered in schools as one of the foundations of PDPs for NSTs.

While it must be said that induction programmes for novice teachers in various countries differ greatly in terms of definition, duration, programme components, target teachers, funding sources and operating mechanisms, they nonetheless tend to adhere to a common understanding that the school should be the centre of operations and that this local focus is one essential condition of the effectiveness of such programmes (Howe 2015; McCormack, Gore and Thomas 2006; Wayne, Youngs and Fleischman 2005). Although mentoring is the most effective activity in mentoring programmes, this does not mean that it is the only

activity. On the contrary, it is important that novice teachers continue to receive support from multiple sources, both on the job at school and in the wider profession (Fletcher and Barrett 2007; Ingersoll and Smith 2004; Wong 2004).

Among the most effective ways that the school can deliver activities to support novice teachers is through the existence of professional learning communities, which can be defined as groups of teachers who share their practices and study them critically with each other (Fresko and Nasser-Abu Alhija 2015; Windschitl, Thompson and Braaten 2011). In other words, through PLCs operating in their schools, teachers search for learning, constantly share it and act on their learning, so that these communities build the capacity of teachers to undergo continuous improvement. In the Omani context, PLCs have still not officially taken their place in schools, despite the attempts of various individual educational supervisors to implement them in the schools that they supervise, whether at subject level in each school, or to include teachers of a given subject in all of the schools which they supervise.

The primary aim of community learning for teachers is professional development, that is, developing knowledge, equipping the teacher with skills and experience, and enhancing the effectiveness of teaching. The literature provides evidence that this aim is often achieved through participation in learning societies, so that the teacher builds knowledge, learns to collaborate with colleagues, seeks help and learns how to listen to fellow teachers and provide assistance to them, thus linking daily practice with theory, gaining greater self-confidence and showing greater commitment to changing practice and trying alternative methods (Mitchell 2012; Stoll et al. 2006; van Es 2012; Wood 2007). Although the literature indicates that the learning community can be an effective way to develop all school teachers in general, this does not detract from the truth of the contention that this professional activity offers a valuable form of support for Omani novice science teachers in the induction programme, because at this stage, they need an opportunity to talk with colleagues about what they are doing within the context in which they work. They also need a safe situation to discuss their difficulties and explore their problems without fear of evaluation, whether from the educational supervisor, the senior teacher or the principal.

Dufour claims that the main feature of PLCs is a “culture of collaboration” arising from “a systematic process in which teachers work together to improve their classroom practice” (2004, p.9). Stoll et al. (2009) list five main characteristics of the effectiveness of PLCs, one of which is cooperation between teachers to enhance group and individual learning, thus serving the purpose of PLCs, which is to produce modern educational practices within the school and focus on building common values among its employees (City et al. 2009; Allen 2013; Ellis et al. 2015; Philpott and Oates 2017). This is the same purpose ascribed to teachers’ agency (see Section 8.4.3).

Thus, the role of policymakers and implementers in the Omani education system is to focus on building bridges of cooperation between school personnel and enhancing the values they adopt to reach the ultimate goals of improving the educational service provided to students and raising the level of performance.

8.4.1 Mentoring of novice science teachers

Mentoring is the most common activity that PLCs use to educate teachers in the Western context, where the literature indicates the effectiveness of in-school mentoring and its importance for novice teachers (Alatas 2019; Fletcher and Barrett 2004; Ingersoll and Smith 2004; Smith and Ingersoll 2004; Wong 2004). Mentoring is a formal professional development relationship within a school in which experienced teachers (mentors) share their knowledge and experience with novice teachers (mentees) in order to enhance their personal and professional development (Wong 2004). The word ‘formal’ in this definition clarifies that effective mentoring programmes should link mentors and mentees in an official and structured manner. In addition, it distinguishes the informal mentoring ‘buddy system’ based on the initial assistance from well-meaning colleagues to novice teachers who communicate independently (Feiman-Nemser 2001).

There is still no provision for mentoring to take place in Omani schools, despite its great importance in supporting the policy for the professional development of novice science teachers. This importance lies in the inability of the SIPTT, in the long run, to meet the requirements of direct training for all of the novice teachers who are appointed to MoE posts. Also of direct relevance is the inability of the

Institute's trainers to follow up all new teachers in the eleven educational governorates, bearing in mind that the MoE annually recruits more than 1,500 novice teachers in all disciplines. In addition, the SIPTT has nine other training programmes for groups of experienced teachers, school administrators and educational supervisors, and all of these programmes need to follow the impact of the training. Therefore, in order to ensure the success of this policy in achieving its goals, there must be PD activities in schools, such as the mentoring. This mentoring activity must also be formal and be integrated with the orientation programme presented at the SIPTT.

Other factors that should be considered to ensure the success of mentoring activity in Omani schools include the appointment of suitably qualified teachers to serve as mentors for all novices. Not all experienced teachers can become mentors; experienced teachers must be carefully screened and must meet certain criteria in order to take on this role, then they should be trained and provided with ongoing professional support (Feiman-Nemser et al. 2000).

As an insider of the system, I would conclude that Omani schools will be able to play a mentoring role for NSTs as part of their induction programme provided that certain conditions are taken into consideration; for example, the mentors and mentees should be matched in terms of teaching level, subject and class. Matching is very important, with the aim of exchanging knowledge and helping novice teachers plan and reflect on their own practice (Villani 2004). The teaching burden should also be reduced for novice teachers, especially during the first year, in order to provide them with the opportunity to learn teaching methods effectively, as they need time to work with their mentors and attend classes with other teachers in the class, discuss issues and ideas with colleagues, and sit with them to prepare lessons. The last point is that mentors should have a relatively light teaching load and be assigned no more than five new teachers as mentees (Bleach 1999; Gray 2000; Othman and Senom 2019; Wilkin 1992).

It should be noted that in 1998, the MoE tested a programme in the Sultanate's schools, aimed at gradually supporting teachers in school. The Senior Teacher as Resident Supervisor programme was designed to support teachers in their daily practice and studies have proven it to be effective in providing support to

school teachers in general and to novice teachers in particular (MoE 2012; MoE 2017). Consequently, it can be asserted that Omani schools are able to provide career guidance services to NSTs through the senior teacher, if the criteria detailed above are taken into account for the success of the mentoring programme.

8.4.2 Professional learning communities in remote areas

As for schools where there are novice science teachers who require mentoring services but which are located in the more remote parts of Oman and therefore do not have a senior science teacher in place, it is possible to benefit from the experiences of expert teachers in the same school, or those in neighbouring schools, who have the same quality and standards required in the framework of the so-called 'subject coordinator' (Thorpe and Tran 2015; Ribbins 2007). Another possibility in the Omani context would be the use of e-mentoring through the educational portal in order to provide mentoring services to schools in remote areas. The MoE has an electronic platform capable of providing NSTs in these schools with the required knowledge and skills through computer communication tools such as email messages and video conferencing, without restrictions of time, location and service. The literature indicates the importance of using the e-mentoring alternative in rural areas as one of the activities comprising an induction programme (Alemdag and Erdem 2017; de Janasz and Godshalk 2013; Dorner 2012; Hunt et al. 2013; Parra Zambrano and Badilla Quintana 2014).

The importance of mentoring in the induction programmes for novice science teachers and the great momentum enjoyed by this activity in educational contexts throughout the world illustrate the need to conduct in-depth studies of mentoring and e-mentoring in the Omani context and to identify the applications and practices necessary to benefit from this global trend, in order to support NSTs in Oman's schools, especially in remote areas.

More recently, professional learning communities have taken a variety of forms with the aim of offering a range of support to novice teachers in remote and isolated areas. Among these forms are seminars, in which teachers meet in their PLCs in order to exchange details of their practices and critically examine them, to develop their knowledge base and to provide emotional and professional

support to each other. In a study conducted in Israel, Fresko and Nasser-Abu Alhija (2015, p.45) found that “the seminars were safe havens in which novice teachers could express their feelings, frustrations, and deliberations without fear of judgement”. Such seminars could be usefully exploited in the Omani context, whether for NSTs in remote schools or even those in city schools, as long as they are formally structured so that the participants are peers in equivalent professional positions. It is suggested that they should take place outside school but in a familiar environment, such as the training centres in the governorates or any public place where teachers can meet. This arrangement would enhance the participants’ sense of security and confidence, thus enabling them to openly and freely disclose their feelings and thoughts.

Conducting these seminars in the Omani context requires many conditions to be taken into consideration, such as an understanding that they are not a substitute for mentoring, but are rather an integral and complementary component of the induction programme for novice teachers. It would also be important for the content of such seminars to change in focus during the school year, beginning in semester one by addressing difficulties of an emotional nature, such as how to deal with discipline problems or to adapt to the new profession, then gradually taking on more professional and stimulating characteristics, with topics relating to teaching, learning, assessment and professional identity. In addition, these seminars should be led by educators who have a clear understanding of the stages that NSTs go through, so that they are able to adjust the activities and their content accordingly, with the aim of maintaining effective learning communities over time. Herrington et al. (2006) add that the more homogeneous the composition of novice teachers is, in terms of length of service, subject and grade, the more useful PLC seminars will be.

These seminars have evolved and are now available online to provide collaborative support and professional development for novice teachers, who are able to access curriculum resources through a website which is constantly updated, in addition to communicating through the site with other novice teachers, with mentors and with expert teachers, through discussion boards (DeWert, Babinski and Jones 2003; Herrington and Herrington 2004; Schuck 2009).

The present study has found that in Oman, in the absence of guidance and leadership in such initiatives by the MoE or educational governorates, NSTs, especially those working in remote areas, have created learning communities for themselves, through the WhatsApp social networking application on their smartphones (see Chapter 6, Sections 6.2.1, 6.4.2, 6.4.3). These WhatsApp-enabled learning communities are general in nature, with members comprising single-grade teachers with lengths of experience from novice to expert, working in all of the educational governorates of Oman. Such communities are more prevalent among female teachers and they focus uniquely on how to teach the school curriculum, without addressing issues specifically affecting novice teachers. Despite the growing popularity among Omani teachers of WhatsApp groups and other school groups, and despite the claims of their members that they derive great benefit from them, there appear to be no studies in the Omani or global literature that have explored the use of the mobile phone as a tool for the operation of PLCs for novice teachers.

It is clear that the planning, creation and delivery of induction programmes for NSTs should not be limited to the central level; rather, the MoE should adopt career development policies based on the role of the school as the place where teachers practice their profession. It is equally clear that the diversification of induction activities has great value in enhancing the ability of the educational system to support novice teachers.

8.4.3 Teacher agency among NSTs

Although novice science teachers face many challenges in the early years of their appointment, this does not mean that they lack the skills or knowledge to enable them to do their job. Fransson and Gustafsson (2008a, p.13) argue that novice teachers should be seen "as competent rather than as incompetent people [who] thus need help", while Wilson and Deaney (2010) found that novice teachers did not always see themselves as "wholly novices". It follows that NSTs, even if they have only recently graduated, have potential and skills that can be employed in their schools' professional learning communities. Another relevant fact is that most NSTs are young; therefore, they are more in touch with the culture of schoolchildren today than their senior colleagues, as well as having more recent

knowledge and skills. This potential too can be invested in promoting aspects of professional development in their schools' PLCs (Bjerkholt and Hedegaard 2008; Fransson and Gustafsson 2008b).

I argue that these facts underline the importance of engaging NSTs in exchanging experiences as a matter of priority, by providing them with the opportunity to develop their professional competence based on their abilities and aspirations. They also have special values, directions and needs that they seek to reinforce in school. I believe that these considerations are important in creating professional learning opportunities for novice teachers in terms of negotiating their own learning and practice in ways appropriate to the current stage of their career development and providing active learning opportunities while taking into account their individual preferences (Day and Pennington 1993; Eros 2011; Richter et al. 2011). These are the attributes of teacher agency that lead to its definition as "an individual's ability to plan, enact change, direct and organize their actions" (Wilson and Deaney 2010).

In the Omani context, the concept of teacher agency has not yet influenced the methods of learning among NSTs, perhaps because of the novelty of the concept in Western countries on one hand and the weakness of PLCs in Omani schools on the other. However, this study has found evidence that NSTs enjoy the attributes of teacher agency, manifested for example in the refusal of a number of them to participate in the SIPTT's NTP on the grounds that its scheduling is inappropriate for them and affects student learning, or that its content does not meet their aspirations. Some NSTs were found to have communicated with trainers to persuade them to adjust the training schedules to suit their needs, while others trained their fellow teachers in certain skills, especially the use of particular classroom techniques, and some NSTs created WhatsApp groups to share knowledge and experience among themselves. In addition, some school principals assigned NSTs to provide training workshops for fellow teachers. All of these activities provide evidence of NSTs manifesting agency by taking the initiative to exercise their responsibility for teaching and developing themselves in whatever ways they see fit for themselves, their students and their schools.

Teacher agency is essential in building knowledge through learning in the workplace and in addressing professional development challenges (Hunzicker 2011). Therefore, the interactions of novice teachers with professional development, setting their individual goals and motivating the desire for PD are the most prominent features of teacher agency in PLCs (Gurney and Liyanage 2016). From the above, it follows that novice teachers' learning and professional development does not necessarily depend on organizational and institutional intervention, either through identification programmes or formal and informal mentoring programmes (Biesta, Priestley and Robinson 2015; Underhill 1992). It is also clear that the topic of teacher agency needs more research, especially in Eastern contexts, to explore the interactions of novice teachers in PLCs. It can be concluded that NSTs in Oman have a pressing need to diversify their acquisition of skills and knowledge, whether through officially organized in-service training or independent PD activities, in order to optimize their learning and their professional development.

8.5 Contributions of the study

This study has made many contributions which may be seen as enriching the literature by fostering a broader understanding of the field of the professional development of novice science teachers. Three main issues have been discussed in this thesis: the uncertainty surrounding the MoE's policy on the professional development of NSTs, the challenges to the PD of novice science teachers and their implications, and the use of mentoring and professional learning communities. In exploring these issues and ideas, the aim has been to develop a new understanding that guarantees the quality of training for NSTs. The study has contributed to providing additional evidence on the enactment of any professional development policy for novice teachers in general. The following paragraphs highlight these contributions.

The first contribution is in clarifying the terminology. The global literature uses a number of terms which might be applied to the NSTs with which this study is concerned, including 'beginning teachers', 'new teachers', 'novice teachers', 'newly qualified teachers' and 'early career teachers'. All of these expressions, notwithstanding the different cultural contexts in which they have been used, refer

specifically to those who have recently finished their studies in teacher preparation institutions and have now begun to work as teachers in schools.

The findings of this study indicate that the concept of the novice teacher should be extended to a wider group, such as those who have recently moved from teaching one stage to another, those who have been teaching in remote areas and have now moved to schools in the city or vice versa, and to those whose employers have changed their field of teaching from one subject to another. The argument here is that these three groups face the same challenges and symptoms as those confronting the group defined in the paragraph above, a set of challenges which can be expressed by the terms “reality shock” (Veenman 1984, p.152) or “praxis shock” (Kelchtermans and Ballet 2002, p.109). Therefore, these teachers need additional support in their professional development, perhaps not focused on the emotional domain but rather on the pedagogical and ecological domains.

Secondly, this study has contributed to understanding how educational change is related to developing professional development policies for teachers in general and NSTs in particular, in the Omani context. Its findings reinforce arguments about “triple-level change” and the concept of “systematic change” (Fullan 2009, pp.15 & 100), with the aim of including the school’s effective role as an integral part of official PD policy. In particular, the study has shown that the borrowing and transfer of policy is related to the results of the global indicators TIMSS, PISA and PIRLS, supported by international organizations, and that one of the reasons for borrowing policy is to use education to achieve economic growth supported by a set of economic theories. In the Omani context, the haste of policymakers in transferring professional development policy from educational systems that achieve advanced results in international comparisons, with the aim of satisfying some international organizations, may not serve their long-term objectives in meeting the aspirations of the Omani education system. The stakeholders at local level were not satisfied, noting that the policy of developing a national strategy for science had not achieved its stated goals, due to the lack of participation of actors at the governorate and school levels in its implementation.

The third contribution of the study is not limited to an improved understanding of initial teacher training for NSTs in Oman, but extends to providing additional evidence that illustrates some of the issues which have been identified in other countries as well. For example, evidence has emerged from the fieldwork in Oman which supports and confirms the theory about the uncertainty of the policy on PD for NSTs. For example, the lack of a clear common policy document on the mechanisms for the delivery of PD content to NSTs led to conflicting views between stakeholders. It has also led to a disparity in understanding among stakeholders of the new policy objectives, reflected in the implementation mechanism, in addition to the weak coordination between the various arms of the General Office of the MoE involved in this area. The study has further provided evidence to strengthen understanding of the challenges facing those involved in initial teacher training. Thus, its findings offer additional evidence to support a number of conclusions in a totally different cultural context such as the challenges related to subject knowledge development, administrative problems accompanying the implementation of the new policy and support during the early years of a novice science teacher's career, which are the most prominent challenges that the various stakeholders encounter in delivering professional development programmes to NSTs.

Fourth, the findings of this study contribute to knowledge by providing additional evidence from the Omani context that it is possible to apply the principle of teacher agency as one aspect of implementing the policy of reforming PDPs for novice teachers, consistent with the observation of Lasky (2005) that teachers are not passive chess pieces in the educational reform process but rather active agents, regardless of whether their actions are effective. The results of the study also contribute to confirming the importance of PLCs as one of the most important professional development tools for novice teachers, facilitating collaboration between experienced and novice teachers in groups where they participate in regular, systematic and sustainable courses with the aim of developing their teaching abilities and thus ultimately improving the performance of their students. Accordingly, the results of this study contribute to illuminating the role that PLCs can play in placing novice teachers as professional agents in their own professional development by making decisions related to the skills and

knowledge they need to acquire, based on their understanding of the needs of their students and their school environment.

Fifth, this study is the first to examine policy on the professional development of novice science teachers as part of the overall PD policy of the MoE in Oman, as represented by the SIPTT, taking into consideration that it is an Omani initiative with actors at the global level aiming to develop the education system and compete with global education systems. Therefore, it is a study that explains the interaction between the national education system and the forces of global change, given the desire of Omani stakeholders to transfer global initiatives successfully as components of educational reform. Borrowing, policy transfer and the globalization of knowledge applied at a national level may be inconsistent with the realities of the local level. Transferring the concepts of induction, guidance and reflection without capacity building, for example, from the decentralized systems of the West to the centralized system in Oman, may create a contradiction at the level of policy implementation in the governorates and schools; thus, this study has demonstrated that transferring a policy which operates well in a Western context to any non-Western context is not necessarily straightforwardly possible, because the policy and its underlying concepts may not be directly applicable to the different organizational and societal culture. This contribution is in line with the remark of Schweisfurth (2008:34) that “the notion of borrowing was gradually questioned as educational systems came to be regarded as interwoven in the fabric of their society”.

The sixth contribution is methodological. This study has confirmed the value of the established strategy of using document analysis, questionnaires and interviews to investigate stakeholders’ perceptions and practices regarding policy on the PD of novice science teachers. Although this methodological approach is relatively common and by no means original in itself, it is notable that this study has used data triangulation to compensate for weaknesses inherent in previous research which has not adopted this strategy. Therefore, the methodological contribution of this study lies not so much in the methods themselves but in their application. More specifically, the design of this study has two innovative aspects. The first is that it was not limited to involving NSTs in the evaluation of the professional development policy applicable to them, but also included other

stakeholders, both at the central level (policymakers at the MoE) and at the regional level (policy implementers in the educational governorates), which helped the investigation to deliver a broader insight into the phenomenon under scrutiny. The second aspect is related to the scope of the research, which encompassed stakeholders' stated perceptions of the professional development policy as well as their practices, allowing a more wide-ranging policy evaluation.

8.6 Summary

This chapter has presented a comprehensive discussion of the results of the present study, regarding their impact on the practical policies implemented in the Omani education system and their relation to the relevant research literature. On the positive side, it is important to recognize here that a certain level of intended change and impact in the field of policy on the professional development of NSTs in the MoE is reflected in the practices reported by the stakeholders, with NSTs showing a level of recognition and awareness of the importance of this policy and its reflection on student learning outcomes.

However, this chapter has highlighted the complexities of implementing the said policy by noting the extent of the combined effects of three issues in weakening the practice in the Omani context. These issues can be summarized as ambiguity, challenges and the exclusion of schools. First, the ambiguity of the current PD policy has been exacerbated by a failure to communicate it clearly to all stakeholders at the three different levels. Secondly, the common challenges facing stakeholders—whether policymakers, policy implementers or new science teachers—in the construction and delivery of professional development programmes have contributed significantly to the weak practice of the policy in Oman. In other words, its goals have not been met, as a result of common challenges among stakeholders on three fronts: developing subject knowledge, implementing the new policy administratively and providing support to teachers during their early years. The third major issue is that the policy has been managed, planned and implemented from the top down and this heavily centralized approach has contributed to excluding schools from playing an active role in supporting NSTs through mechanisms such as mentoring activities and

professional learning communities, in order to support and empower novices with the necessary educational skills.

This chapter has thus demonstrated that the study has made six contributions in different areas. It is hoped that these contributions will enrich the literature in developing a broader understanding of the field of the professional development of NSTs.

Chapter 9

Conclusions and Implications

9.1 Introduction

This concluding chapter begins by summarizing the findings of the study, then offers an assessment of the research outcomes. Next, Section 9.4 enumerates the limitations of the study and Section 9.5 draws attention to some areas in which further work is suggested. The chapter continues by discussing a number of implications to be drawn from the study and concludes with a presentation of the researcher's personal reflections on the research process.

9.2 Summary of key findings

Bearing in mind the critical importance of professional development for novice teachers throughout their early years in the job, the main aim of this study has been to investigate the new policy on the PD of NSTs pursued by the Ministry of Education in Oman, in order to complement the vision of the Ministry on the future development of the education system in relation to the qualification and training of teaching staff and related personnel. More specifically, the study has sought to evaluate the policy on the professional development of NSTs from the point of view of the stakeholders, whether they be makers, implementers or recipients of that policy. To that end, the participation of these three groups of players involved in creating, delivering and receiving the policy is a contextual feature that has characterized this study. The findings have revealed that there are both internal and external factors which have led the MoE to create its new PD policy.

The study has shown that the various directorates of the MoE's headquarters have a great interest in the category of teachers in general and that this interest is reflected in a sustained effort to deliver quality training programmes which focus on the practical aspects of expanding teachers' capabilities with cognitive skills and modern methods of teaching that are consistent with the Ministry's orientation towards a student-centred approach to teaching. This strong interest in the PD of teachers in terms of training and qualification does not, however,

appear to have been translated into significant provision directed specifically at the category of novices, meaning those who have joined the teaching profession in the past three years, whether teachers of science or other subjects, except in the form of a single training programme, implemented centrally at the Specialized Institute for the Professional Training of Teachers and delivered to NSTs during their first year of teaching. Once NSTs have completed this programme, their professional development relationship with the Ministry, represented by the SIPTT, ends and they have no expectation of being offered the opportunity to participate in any programme of CPD throughout the remainder of their teaching career at the MoE.

At the educational governorate level, participating policymakers asserted the existence of a true partnership between the SIPTT and the provincial training centres in assuring the delivery of PDPs to NSTs. The findings, however, reveal a reality whereby in practice, the educational governorates, despite their abundant human and material resources, make very little contribution to implementing the policy on PD for NSTs, whether in terms of implementation or of follow-up. Indeed, the role of the governorates in relation to this policy was found to be limited to informing NSTs of the programme schedule in order for them to attend the SIPTT on the appropriate dates.

In a similar way, at the school level, the study has found that the practical enactment of that part of the PD policy concerned with the induction programme provided to NSTs does not allow school personnel to play any formal planned role either in delivering the programme or in following it up. More clearly, the policy does not specify any formal complementary role that the principal, the senior teacher or other colleagues in the school can play in order to support NSTs.

The findings outlined above led to the identification of three main issues that were the focus of discussion in Chapter Eight: uncertainty regarding the policy on the professional development of NSTs, challenges and common obstacles to the implementation of that policy and the potential value of mentoring and professional learning communities in Omani schools. These issues were

discussed in detail in the Omani context, alongside a comparative review of their treatment in the global literature.

As indicated above, the findings have revealed various positive indications of the contribution made by policy on the PD of NSTs in the context of Omani learning. One of these is the satisfaction of NSTs with what is presented to them within the framework of the policy, taking into account its development in line with the context of the education system in Oman, in terms of the time allowed for the implementation of the programme and the mechanism of its delivery and follow-up. The study has also found that other stakeholders welcome this policy because it establishes a new phase of organized professional work at the MoE with regard to development programmes for teachers in general and for novice teachers in particular.

9.3 Evaluation of research outcomes

The first of the three research questions (Chapter One, Section 1.4) prompted an investigation of the factors that led to the MoE adopting a new policy for the professional development of NSTs. Chapter Five of this thesis has reported the findings resulting from an examination of the Ministry's interest in introducing such a policy, of the factors underlying its adoption by the Omani education system and of the three-tier structure within which policymakers conceived the policy as being implemented. It also offered a detailed account of how the new PD policy was seen to be delivered by the SIPTT the headquarters of the MoE. Although the chapter contains rich informal information about the policy on the PD of NSTs elicited from the various stakeholders by means of a number of research tools, the limited time available for the current study meant that I was unable to gain access to a significant body of ministerial documentation relating to the policy, whether written or electronic, which prevented me from determining with any degree of certainty or detail what outcomes the Ministry had sought to achieve by implementing it. Further research will be conducted in future in order to address this gap in knowledge.

Chapter Six of this study covers the second research question, which relates to the expectations of major stakeholders regarding the current provision of PDPs for NSTs and their relation to the MoE's policy goals. Rich data obtained from the

perspectives of a variety of stakeholders were presented under three main themes: the three-tier structure within which PD provision is delivered and the extent to which its operation meets policy objectives; key topics proposed for the professional development of NSTs in their induction programme and stakeholders' expectations regarding methods of implementation; and the expectations of NSTs regarding the support associated with PDPs in the first three years. The examination of various subtopics within this three-part analysis has provided satisfactory and adequate answers about what policymakers, implementers and NSTs themselves expect from the Ministry's adoption of its new PD policy.

The third research question asks how successfully stakeholders perceive the new policy to have been implemented, in terms of its impact on learning and practice, and Chapter Seven of the thesis has sought to provide broad and satisfactory answers to this question. More specifically, Chapter Seven has addressed the issues of policy implementation and evaluation from the perspective of the various stakeholder groups, beginning by asking whether the new policy is seen to be working well, whether it is being implemented effectively and whether NSTs perceive its implementation as having met their needs. The second part of the chapter then delivers a comparative analysis of the implementation of the policy by assessing the similarities and differences among the stakeholder groups in their perceptions of success or failure in respect of four major issues, chosen for their importance and prevalence in practice and implementation, namely the timely delivery of professional development initiatives, the content of PDPs, the planning of PD provision and following up the effects of training.

Analysis of the rich findings reported in Chapters Five, Six and Seven resulted in the identification of three major issues requiring further investigation, these being uncertainty surrounding the MoE's new policy on the professional development of NSTs, challenges and common obstacles to the provision of PD opportunities for this category of teachers, and the potential for mentoring and professional learning communities to operate in Omani schools. The discussion presented in Chapter Eight sought to shed as much light as possible on these issues, as they are of great importance in evaluating both policy and practice on the PD of NSTs employed by the Omani Ministry of Education. The focus of this in-depth

discussion was therefore on the significance of these three issues in the Omani context, with reference to treatment of equivalent matters in the global literature and in the education systems of other countries throughout the world.

9.4 Limitations of the study

This study has focused on the investigation of the MoE's policy on the professional development of NSTs from the perspective of the various sets of stakeholders. As with any research project, not everything worked out as planned. In this section, I outline the limitations of the study and consider how these can be used to identify research opportunities.

9.4.1 The scope of the investigation

The study was limited to investigating the perceptions of three categories of stakeholders, namely policymakers, implementers and NSTs, concerning the implementation and evaluation of the professional development policy with particular reference to the services provided by the SIPTT to NSTs working for the MoE in Oman. Its scope did not therefore extend to an evaluation of the effects of the PD policy on the practice of NSTs in the classroom.

9.4.2 Transferability

The findings of this study can be seen as a critical reflection on cultural issues in similar contexts and therefore are very useful for researchers intending to conduct further studies in the field of policy on the professional development of NSTs, or indeed of novice teachers in any other subject. Since these findings have substantiated the importance of attention to cultural and contextual differences in policy framing, they are directly transferable only to other education systems in the Middle East with a similar Islamic and cultural context, which is known as 'ecological validity'. Thus, the methodology adopted in this study could be applied to studies of NSTs' PD in other countries in the Middle East where conditions are similar to those in Oman, such as other Arab Gulf states or Arab and Islamic countries more widely. If the findings of such studies were similar to those of this study, it could be concluded that so-called naturalistic generalization had been achieved (Johnson and Christensen 2019; Melrose 2009).

The study has referred in various places to issues related to the political, cultural, social and economic context of Omani society and to their implications for the education system in Oman; in other words, the study must be seen as context-bound. While its findings cannot therefore be generalized to other countries throughout the world, it is worth bearing in mind that they may have important and valuable implications for education systems in places where social, cultural, economic and political conditions are similar to those of the Sultanate, such as the neighbouring Arab states of the Gulf region.

9.4.3 Limitations in the reporting of findings

This study has used three research methods that complement each other so as to provide a rich and in-depth picture of the research topic. However, not all of the data and findings obtained have been reported in this thesis, because of the limited time available for the study and restrictions on the number of words allowed. Consequently, the data generated by the questionnaire were used only in an analysis designed to further illuminate some of the topics arising from examination of data from the document analysis and interview responses. Therefore, the current study has not sought to make use of a comparative analysis of questionnaire data to expand the scope of the findings, such as by making a comparison among NSTs according to the governorates in which they work or by comparing the responses of male and female participants. These data will be stored for potential use in future research projects.

9.5 Suggestions for further research

With reference to the overall findings of the study, more research relating to policy on the PD of novice teachers in the Omani context could be undertaken. Before going into detailed suggestions, I would like to emphasize the necessity of coordinating the research conducted on Omani teachers and organizing it so that previous research is reviewed and the results are used, ensuring that such research is not conducted in isolation from the results of previous studies in the field of professional development for Omani teachers. I firmly believe that the usefulness of the results of all such studies will be augmented by making sure that they are related to each other.

As for the suggestions themselves, they take account of the results of the present study while bearing in mind the limitations enumerated in the previous section and are framed by an attempt to answer three questions which should be addressed when making recommendations for further research: What should be researched? Why should it be researched? How can it be researched?

One area of research that could be undertaken is investigating the impact of PDPs on teaching and learning in the classroom. This topic was mentioned by a number of policy implementers in the educational governorates, more specifically by educational supervisors, who opined that the effectiveness of any policy is related to the practice provided in the classroom. Such an investigation should have as its focus the impact of PD policy on NSTs, on their performance in the classroom and on student achievement.

Alternatively, a comparative study could investigate novice teachers in different disciplines and compare them in terms of a number of variables, such as length of experience, qualifications, gender or governorate, whether using the same methods as in this study or adopting some other methodology, in order to measure the effectiveness of the professional development policy applied to a category of novice teachers other than NSTs. The aim of this research would be to consider the effectiveness of PDPs and the extent to which they meet the goals and objectives of PD policy, in addition to providing more empirical evidence and examples of contextual realities, such as standards of practice and difficulties encountered. Such evidence might usefully be gathered through the use of longitudinal methods of data collection. This issue was raised by senior science teachers because of what they believed to be a difference in professional development policies among novice teachers.

It would perhaps also be interesting to replicate this study using the same methodology or taking a case study approach to examine the implementation and effects of similar policies regarding novice teachers. These investigations could be conducted in other educational governorates, or in other countries contextually similar to Oman. The advantage of this approach would be that through repetition, as well as the accumulation of more qualitative data from similar studies, a degree of analytical generalization would be achieved.

This study points to a set of challenges facing stakeholders in creating and implementing policy on the PD of NSTs in Oman, but limited time and the need for a clear focus mean that the study has not sought not present solutions to the challenges identified. This raises the interesting possibility of proposing a study focusing on exploring these challenges more deeply and seeking to identify potential solutions to them. Such a piece of research could take the form of a case study of a single governorate, preferably one characterized by diversity in the urban and remote rural location of its schools, with the participation of all policy stakeholders. The aim of this research would be to provide support to the policy of developing not only NSTs in particular, but also novice teachers of other subjects more generally.

Another important topic of investigation is PLCs and their different methods; it would be useful to examine their impact on NSTs or on novice teachers in general in the Omani context. Although, as I indicated earlier, PLCs and mentoring do not operate formally in Oman, scientific studies of this topic in the Omani context would potentially yield models that would contribute to the development of a professional development policy for novice teachers.

9.6 Implications for policy and practice

Benefiting from international experience and expertise is an important requirement in reforming educational policies in theory. However, the risks and potential problems of obtaining these ideas must be considered in light of the cultural differences between the education systems of different countries. Plans for the borrowing and transfer of policy must be accompanied by the strategies necessary to put them successfully into practice (Phillips and Ochs 2003). In the Omani context, international consultation and cooperation with external experts have been utilized in framing policy on the PD of novice teachers and this has entailed advising providers of PDPs for novice teachers to consider the context in which Omani teachers are prepared before service, the mechanisms for selecting those to be appointed as teachers by the MoE, the context of schools in Oman and the extent to which decentralization allows the Ministry to delegate provision to other levels in the education system. It should be emphasized that these ideas are taken into account before making a policy decision.

The relationship between politics and practice is a controversial issue in education (Bush 2011). The induction programme for NSTs is part of the MoE's professional development policy, yet policymakers (officials of the SIPTT) appeared to be content to implement this policy without seeking an understanding of the opportunity for practice that should be made available to those teachers within schools, nor of the support that should be provided for them to put the policy into practice in accordance with the policy goals. Therefore, policymakers are advised to pay attention to the interaction between policy and practice, and to enable other stakeholders to understand policy goals using the same knowledge.

On a practical level, NSTs expressed a different view of policy. They stated the belief that several factors should be taken into account when implementing the policy, including their workload, the specificity of the science subject in the Omani education system, the possibility of applying modern teaching strategies in classes comprising more than 38 students, the provision of tools and support in school laboratories, the conditions of work in remote schools and the suitability of the content of the training material for the particular age groups to be taught. NSTs stressed that the focus should be on their practical needs in schools, rather than on delivering professional development content of a theoretical nature. This explains how NSTs perceived the policy at micro-level, in contrast to the way in which policymakers perceived it at macro-level. Therefore, the content of professional development programmes should be presented to NSTs in a practical way in order to enhance the achievement of policy aims for teachers.

This study found that schools appeared to make little or no contribution to the professional development of NSTs, although their role in teachers' induction programmes is an integral part of PD policy in education systems throughout the world. I have two suggestions to address this weakness in Omani PD policy. The first is that an in-school mentoring programme for novice teachers be designed and tested, then allowed to run for a year or more in order to measure the effectiveness of school-based induction programmes. My second suggestion is for the creation of multiple professional development activities which would serve to give Omani schools an active role as communities of professional learning.

Capacity building is a prerequisite for sustainable educational change in the MoE. Wedell (2009) argues that proper implementation requires appropriate training in the sequencing model. Therefore, in light of the increasing number of novice teachers that it recruits annually, the MoE should adopt an initiative of capacity building for local trainers in the provincial centres as part of the professional development policy. It should also promote capacity-building initiatives for school principals and senior teachers to be trained to act as mentors for novice teachers in schools.

Several studies suggest that teacher induction programmes should be run over a number of successive years, so that novice teachers can gradually grow in their careers (Carver and Feiman-Nemser 2009; Wong 2004), whereas in this does not happen in many educational contexts. The duration of the induction programme for novice teachers does vary, however. One-year programmes are the norm in most contexts, such as the education systems of England (Carter 2015), Hong Kong (Mak 2010), Australia (Mansfield and Beltman 2014), Vietnam (Thorpe and Tran 2015), Estonia (Eisenschmidt, Oder and Reiska 2013) and the Caribbean (Baker-Gardner 2016), and two-year programmes are in place, for example, in various states of the United States of America, such as California (Moseley 2004) and Connecticut (Bozack 2016). In the context of professional development policy generally, the important thing to consider is what provisions should be made for novice teachers after they finish their induction programme, while in the Omani context, two questions arise: What complementary role should the educational governorates play towards paying more attention to the needs of individual NSTs, whether at professional or personal level? After implementing the induction programme, what is the role of the school and in particular of the principal, senior teachers and colleagues? The answers to these questions would require the establishment of a professional development matrix for novice teachers, or so-called CPD programmes that would include the provision of support and assistance to novice teachers during at least the first three years of their employment.

As to the educational implications in the context of the study, the findings are of particular value in relation to the claim that it is the first investigation of its kind in Oman into the policy on the professional development of NSTs; the educational

importance of the study lies in providing a contemporary overview of the existing policy, as seen through the eyes of its stakeholders, notably including new science teachers themselves, in a large number of educational governorates. The following subsections duly consider the potential educational implications of the study for the three categories of stakeholder employed by the Ministry of Education in Oman, beginning with the policymakers.

9.6.1 Policymakers

It is important that the objectives of the PD policy and the mechanisms for its implementation be communicated clearly to the relevant stakeholders in the three tiers of the education system, by making policy-related documents and plans available when necessary to stakeholders both in the directorates of the MoE headquarters and in the educational governorates. This also requires the production of manuals and practical guidelines to explain the mechanisms, goals, roles and expected outcomes of the policy, taking into account the organization of meetings with stakeholders in the directorates and with school administrators, to raise awareness of the policy, its objectives and the mechanisms for its enactment. Stakeholders in the educational governorates should also be involved in the implementation, development and evaluation of the policy and should be offered help in overcoming the challenges and obstacles to that implementation.

9.6.2 Policy implementers

Those identified as responsible for policy implementation in the governorates should play a greater role in directly implementing the PD policy under scrutiny here, in two main ways. First, the training programmes designed to deliver the policy should be included in the governorates' professional development plans. Secondly, the supervisory body for science in each governorate should have a stronger role, ensuring that subject supervisors offer full direct support to NSTs, especially in those schools in remote locations or where there are no senior teachers of science. This support should take the form of intensive field visits to schools which employ novice teachers, the provision of training programmes and the organization of meetings in such schools, especially during NSTs' first year of service. In addition, educational brochures and guides should be provided in

order to assist NSTs in the acquisition of knowledge related to their teaching methods and to assessment tools for general science and its various branches.

9.6.3 Novice science teachers

An important practical implication of this study concerns the evident need for NSTs to be able to access self-directed professional development activities. The term 'self-directed' refers to PD activities resulting from teachers' private initiatives, which they determine internally (Eekelen et al. 2006). These initiatives are usually facilitated by the personal social networks that teachers seek to use in order to obtain information with the aim of developing their professional practice (Brown, Vissa and Mossgrove 2012; Hanraets, Hulsebosch and de Laat 2011). They are usually informal models that are specifically associated with an individual's needs (Lom and Sullenger 2011; Richter, Kunter, Klusmann, Ludtke and Baumert 2011). They also appear more often in areas where teachers feel that they are working in environments that are deprived of professional development (Bouchard 1996).

In the Omani context, the implication of this study is that NSTs are advised to avail themselves of the services provided by the MoE's internet portal and its website, as well as taking advantage of social networks in the formation of personal learning networks, in order to share knowledge, strategies and experience with fellow teachers, so that they can work together to improve the efficiency of professional practice in the classroom. NSTs are also advised to take advantage of the services of learning resource centres in schools in order to develop themselves. These mechanisms will encourage novice teachers to obtain the required teaching knowledge and skills quickly, especially in those remote areas where they currently do not receive the required support in timely fashion.

9.7 Reflections on the personal development of the researcher

My studies for the PhD programme in British universities, especially at the University of Leeds, have been subject to some serious challenges and some frustration, for several reasons, including my level of mastery of the English

language and the major differences between studying in Western universities and doing so in the Arab world.

In conducting the research I have made a journey consisting of several stages including various experiences in deciding on the subject of my research, developing the study design, selecting the study sample, deciding on the mechanisms of data collection and analysis, then interpreting the results. During this journey I have learned a wide range of skills, such as research, reading, writing, paraphrasing, summarizing, expressing opinions, judging and criticism. In addition, I have acquired various skills related to the use of electronic programs, time management, problem solving and teamwork. I have also learned a lot about other cultures by getting to know other international students, as well as communicating with the British multicultural environment.

The years of my PhD journey have helped me greatly to have a period of time away from the administrative work environment during which I have been able to look at the work environment through the lens of social scientific research, which has made a great contribution to broadening my own personal awareness and thinking and will therefore help me in future stages of my career.

Difficulties, challenges, frustration, lack of confidence, anxiety, tension, uncertainty and confusion are among the words that have accompanied me on my academic journey, but the sure desire to reach the goal was my spark of hope throughout. Sharing this vocabulary with other PhD students, the constant support of my supervisors and the encouragement of my family have all helped to liberate me from this negative terminology and to transcend it. There have also been wonderful moments when completing and submitting pieces of work and when participating in seminars or conferences, both internal and external, which have had a great impact on me.

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APPENDICES

Appendix A

Semi-structured interview schedule: Policymakers

(A) Questions related to policy on the professional development of novice science teachers:

1) Please tell me something about your role and interest in science-teacher training.
2) There is a group of teachers with one to three years of teaching experience, known as novice science teachers or beginning science teachers. Are these teachers also included in training programmes provided by your directorate? Explain this in further detail.
3) What is the aim of training novice science teachers in the ministry and/or governorates?
4) Do the ministry's stakeholders (your directorate) provide training programmes for teachers in different governorates in Oman?
5) Why has the ministry introduced this policy? What are the factors that led up to this policy?
6) As a policymaker, what are your thoughts on the areas that are supposed to be emphasised within the annual professional development training plan for novice science teachers?
7) How are professional development activities planned and implemented for novice science teachers? (Are novice science teachers involved in the planning?)

(B) Questions related to the professional development expectations of novice science teachers:

1) What types of training programmes does the Ministry/governorates focus on for novice science teachers?
2) Do these programmes meet the requirements of professional development for novice science teachers? Explain your answer.
3) What do you think about the effectiveness of training programmes in addressing the challenges that face novice science teachers?
4) What are your expectations regarding the professional development that you provide to novice science teachers in the areas of curriculum, assessment methods and new teaching trends?
5) Evaluate the effectiveness of programmes offered to novice science teachers from your perspective.

(C) Is there anything more that you would like to tell me about novice science teacher training that we have not covered in the interview?

Note: The above questions may or may not be raised during the interview, so further questions may be asked, based on interviewees' responses.

Appendix B

Semi-structured interview schedule: Policy implementers

(Interviewees: General Director of the Governorate, Director of the Human Resources Development Department or Head of the Training Centre, science supervisors, trainers or principals and senior science teachers).

(A) Questions related to policy on the PD of NSTs:
1) Please tell me something about your role and interest in training science teachers.
2) Please describe the PD of NSTs in your governorate/school in terms of its importance, aim and types.
3) How are professional development activities planned for novice science teachers? (Are novice science teachers involved in the planning process?)
4) How are professional development activities offered to novice science teachers (i.e., novice science teacher opportunities)?
5) Are these programmes capable of addressing the challenges facing novice science teachers today, whether in remote rural schools or urban schools? Please explain.

(B) Questions related to professional development expectations of novice science teachers:
1) In your experience of novice science teachers, how do they perceive the professional development provided for them during their early years?
2) How would you assess the effectiveness of training programmes in addressing the challenges that face novice science teachers?
3) What are your expectations regarding the professional development that you provide to novice science teachers in the areas of curriculum, assessment methods and new teaching trends?
4) Evaluate the effectiveness of programmes offered to novice science teachers from your perspective.

(C) Questions related to professional development activities for novice science teachers:
1) What are the most prominent professional development activities provided for novice science teachers in your governorate?
2) How frequently are professional development activities for novice science teachers provided by the ministry?

(D) Is there anything more that you would like to tell me about novice science teacher training that we have not covered in the interview?

Note: The above questions may or may not be raised during the interview, so further questions may be asked, based on interviewees' responses.

Appendix C

Semi-structured interview schedule: Novice science teachers

1) Have you ever attended a training programme at the governorate training centre? If so, please provide details.

2) Can you describe the availability of professional development activities in your governorate/school?

3) Why do you think these programmes can address the challenges you face?

4) What kinds of professional development activities do you feel are most needed in the early years?

5) How do you think the MoE/governorate views professional development activities for novice science teachers?

6) What could the MoE/governorate do differently/additionally to support novice science teachers?

7) Is there anything more that you would like to tell me about novice science teacher training that we have not covered in the interview?

Notes:

(1) I will analyse the questionnaire data in advance of the interviews; there may be specific questions that I wish to raise to gather more information.

(2) The above questions may or may not be raised during the interview, so further questions may be asked, based on interviewees' responses.

Appendix D

Questionnaire for novice science teachers

SCHOOL OF EDUCATION

Dear Teacher,

I am conducting research on the professional development of novice science teachers in Oman as part of my PhD thesis. A *novice teacher* in this study is defined as *any Omani teacher who has three years or less of teaching experience in Ministry of Education schools in the Sultanate of Oman*. I would be grateful if you could answer the questionnaire before *22 March 2018.*

This questionnaire should take around 45 minutes to complete. Before completing it, please read the following notes.

- This questionnaire is in five parts:

  Part One: Personal details

  Part Two: Novice science teachers' perceptions of professional development programmes provided by the Ministry

  Part Three: Suggested in-service training activities for Omani novice science teachers from their perspective

  Part Four: Open-ended questions

  Part five: An invitation to participate in individual interviews

- All information gained from this questionnaire will be used confidentially and for research purposes only.
- To guarantee participant anonymity, you need not write your name on the questionnaire.
- Your participation is very important to this study, but you have the right not to participate and to withdraw from the study at any time. Thank you for your cooperation.

Sulaiman Al Jamoudi
Sulieman222@gmail.com
Mobile No.: 93536010

PART ONE: PERSONAL DETAILS

Please tick (√):

1) Gender: Male( ) Female ( )

2) Governorate: Al-Dhahirah ( ) Musandam( ) Dhofar ( )
Muscat ( ) Al-Sharqiyah South( ) Al-Batinah South( )

3) Place of graduation: Inside Oman ( ) Outside Oman( )

4) Number of years of teaching experience:
One year ( ) Two years ( ) Three years ( )

5) Teaching location:
School in permanent residence ( ) School in non-permanent residence ( )

6) Job title according to the appointment decision:
Second field teacher ( ) Physics teacher ( )
Chemistry teacher ( ) Biology teacher ( )

7) Cycle of teaching:
Cycle one ( ) Cycle two ( ) Post-basic education ( )
Cycles one and two ( ) Other ( ) ….

8) Have you attended any professional development programmes? (tick ONE)
YES NO

9) Number of training courses that you have attended from the beginning of your employment in MoE until now:
1-4 courses ( ) 5-9 courses ( ) More than 10 courses ( )

PART TWO: Novice science teachers' perceptions of professional development programmes provided by the Ministry.

In this part of the questionnaire, please evaluate the professional development programmes offered to you at the Ministry's main training centre, at the training centre in your own governorate and at school. Please tick (√) one box to indicate your view of each of the following items.		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
10	The programmes offered to NSTs cover modern teaching methods.					
11	NSTs need intensive training programmes in their early years of teaching.					
12	The school principal only focuses on the administrative aspects of the NST's work, such as attending classes and completing records.					
13	Trainers of NSTs are suitably qualified.					
14	The list of training programmes that the NSTs attend in the first years of teaching includes the skills that teachers need at this stage.					
15	The MoE directorates concerned show a strong interest in developing the teaching skills of NSTs.					
16	The senior teacher plays a major role in the development of NSTs' skills.					
17	Training programmes offered to NSTs address the challenges they face.					
18	Meetings of governorate officials with NSTs do not contribute to their PD.					
19	The time allocated to training programmes for NSTs is adequate at this stage.					
20	The educational supervisor provides NSTs with the necessary support for the teaching process.					
21	The training programmes offered to NSTs do not meet their training needs.					
22	The training programmes for NSTs offer a balance of theory and practice.					
23	Training programmes offered in school focus on what NSTs should do in the classroom.					
24	The Ministry encourages NSTs' continual professional self-development.					

25	Class management skills are a prominent part of the training programmes offered to NSTs.					
26	Training programmes offered to NSTs do not address the skills needed to perform science experiments.					
27	Training programmes offered to NSTs are suitable for all grades they teach.					
28	Training programmes for NSTs help them to develop disciplinary skills.					
29	Training programmes offered to NSTs do not focus on the use of continuous formative assessment.					
30	Governorate officials are interested in developing the skills of NSTs regularly.					
31	Programmes offered to NSTs cover issues relating to the rights and duties of the teacher.					
32	Opportunities for self-PD are widely available in the governorate.					
33	NSTs benefit a lot from visits by the principal in terms of developing their skills.					
34	NSTs are made aware of the training plan offered to them in their early years.					
35	PD programmes for NSTs are implemented at appropriate times.					

PART THREE: Suggested in-service training activities for Omani novice science teachers from their own perspective.

This part of the questionnaire lists professional development activities available to novice science teachers. Please tick (√)one box next to each activity to indicate how important you think it is in helping novice science teachers during their early years.		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
36	Training courses in science subjects in the Ministry's main training centre					
37	Joining social networking groups for teachers					
38	Informal meetings with other teachers					
39	Observing other teachers' lessons in the same discipline					
40	Practical sessions in the laboratory					
41	Reviewing the teacher's guide to clarify aspects of the scientific subject and methods of teaching and evaluating the units of study in the subject					
42	Attending conferences at the international level					
43	Weekly meetings with the senior teacher in school					
44	Preparing lessons jointly with colleagues					
45	Delivery of an applied lesson for teachers of specialization in school and discussion of the lesson with colleagues					
46	Observing other teachers' lessons in another discipline					
47	Training days in school before/after the school year					
48	Reading educational publications issued by the Ministry					
49	Attending conferences at the national level					
50	Making use of the Ministry's educational web portal					
51	Professional visits to other schools					
52	Reading educational publications issued by the governorate					
53	Senior teachers' visits and observation					
54	Upgrading degrees and qualifications, Higher Diploma in Education or MA					
55	Curriculum support workshops and seminars in local training centres					
56	Periodic meetings between NSTs and officials in the governorate					
57	Teacher trainers' visits and observation					
58	Methodology training courses during the school year in school					
59	Methodology training courses in local training centres					
60	Supervisors' visits and observation					
61	Reading professional material, e.g. books on modern teaching methods					
62	School principals' visits and observation					
63	Electronic training programmes					

PART FOUR: Open-ended questions

64. Do you think the training programmes offered to you by the ministry/governorate/school during the early years of the job help you teach better? (Tick ONE) YES NO

If YES, please explain how.

65) Do you think there are any other activities that can develop novice science teachers professionally? (Tick ONE) YES NO

If YES, please list these activities in this box.

66) To what extent has the training centre met the training needs of novice science teachers? Please comment on what has been successful in the training offerings and what has been less successful, providing reasons for each answer.

67) How would you describe the effectiveness of professional development in your governorate? Please offer recommendations for further development training.

68) Is there anything more that you would like to tell me about novice science teacher training that we have not covered in the questionnaire?

Part five: An invitation to participate in individual interviews

Dear Teacher,

First, I would like to thank you for completing this questionnaire. Would you be willing to take part in a one-on-one interview with me, during which we would discuss some issues covered in this questionnaire in more detail and in confidence?

YES **NO**

If YES, **please provide your details below.**

Name: ……Email address: ……

Phone number:…….. School: ……

Thank you for taking the time and trouble to complete the questionnaire. This is greatly appreciated.

Appendix E

Summary tables of the quantitative data

(1) Results of reliability test

Variable	Number of Items	Cronbach's Alpha
Part 2	33	0.921
Part 3	30	0.915
Overall	63	0.932

(2) Demographic details of the respondents

Variable	Frequency	Percentage
Gender		
MALE	10	2.5
FEMALE	389	97.5
Place of graduation		
Inside Oman	344	86.2
Outside Oman	55	13.8
Number of years of teaching experience		
One year	147	36.8
Two year	137	34.3
Three years or more	115	28.8
Major		
scientific teacher	225	56.4
physics teacher	36	9
chemistry teacher	52	13
biology teacher	86	21.6
Teaching location		
School in permanent residence	304	76.2
School in non-permanent residence	95	23.8
Cycle of teaching		
Cycle one	230	57.6
Cycle two	87	21.8
Post-basic education	53	13.3
Cycles one and two	3	0.8
Other	26	6.5

(3) Distribution of teachers by governorate

Governorate	Muscat	Al-Batinah South	Al-Dhahirah	Musandam	Dhofar	Al-Sharqiyah South
Freq.	95	79	46	52	65	62
%	23.80	19.80	11.55	13.05	16.30	15.50

(4) Attendance at PD programmes and number of training courses attended

Attended development programmes?	Number of training courses	Frequency
No	0	51
Yes	1-4	259
	5-9	70
	More than 10	19

Appendix F

MoE approval letter

بسم الله الرحمن الرحيم

سلطنة عمان
وزارة التربية والتعليم

الرقم: م.ف.ل.ت: ٢٠٥٥
التاريخ: ٢٠١٧/٨/٩ هـ الموافق

To Whom It May Concern

This letter is to initial authorize **MR. Suliman Abdullah Yaqoub Al Jamoudi** a doctorate student at the University of Leeds to initiate a research titled "***A Critical evaluation of the professional development programmes in-service of novice science teachers: Omani stakeholders perspective***" . However, we would like to highlight that he will have to go through the processes requested when initiating the implementation stage.

This letter has been issued to **MR. Suliman Abdullah Yaqoub Al Jamoudi** upon his request without any liability or responsibility on our part.

Issued on the 8th August 2017,Sultanate of Oman.

Yours Faithfully,

Dr. Suad Mubarak Al Fori
Technical office of studies and research
Ministry of Education
Sultanate of Oman

Appendix G

Participant information sheet

UNIVERSITY OF LEEDS

School of Education
Hillary Place
University of Leeds
LEEDS, LS2 9JT
United Kingdom

Telephone: +44 (0)113 343 4545

Fax: +44 (0)113 343 4541

Web: http://www.education.leeds.ac.uk

enquiries@education.leeds.ac.uk

Participant information sheet

A critical evaluation of in-service professional development programmes for novice science teachers: Omani stakeholders' perspectives

Key stakeholders (officials) at Ministry headquarters and in the governorates will be interviewed. All novice science teachers in participating governorates will be asked to complete a questionnaire and some will participate in follow-up interviews.

Dear Participant,

I am a PhD student in the School of Education at the University of Leeds in the United Kingdom. I am currently carrying out a research project to evaluate in-service training programmes offered to novice science teachers in Oman. I am organizing this research under the supervision of Dr Michael Wilson and Dr Michael Inglis, in the School of Education at the University of Leeds.

I am writing to ask if you are able to take part in the study. Please read the following information in order to help you decide if you wish to take part. Note that you can withdraw from the research at any time during data collection and up to two months after the data collection is complete. If you have any questions, please contact me by email or mobile phone (details at the end of this letter).

What are the aims of the research?

The main aim of the study is to evaluate the training programmes offered to novice science teachers in the Sultanate of Oman. I also seek to:

1) Understand policymakers' plans for the development of training programmes for novice teachers at local MoE training centres in Oman.

2) Investigate novice science teachers' perceptions of the PDPs offered at the governorate training centres to develop their skills.

3) Explore the alignment between novice teachers' perspectives and the intended policy on the role of training centres in the educational governorates.

What would this mean for me and my organization?

You will be providing me with information through an interview in which you will be asked about your professional experiences, opinions and ideas about the professional development for novice science teachers provided by the Ministry and the governorates. With your permission, I will audiotape the interview so that I have a record of our discussion. This interview will take approximately 60 minutes and will take place in your workplace at a time convenient to you. The information gathered will be very important to my research and to get feedback about the evaluation of professional development for novice science teachers in Oman.

Anonymity

The data you provide will be stored by code number. Any information that identifies you will be stored separately from the data.

The data that the researcher will obtain will be stored in a safe and protected location and will be transferred to the M-drive data drive at the University of Leeds. The data will remain there for three years and then be disposed of and destroyed. Anonymous data will be retained and used for future research, without individual participants being identified. If you do not wish your data to be used in this way, please indicate this on the consent form.

During the interview, if you would like to say something that you don't feel comfortable for me to record, please signal this and I will switch off the recorder, and switch it back on again later when you indicate that it is fine to continue recording. Your involvement in the study is absolutely voluntary. You are free to withdraw from the study at any time during data collection and up to two months after the data collection is complete.

Use of data

The data I collect (transcripts) may be used in anonymous format in different ways: reports, presentations and journal articles.

I hope you will agree to participate in this research. In case you have any inquiry, please feel free to contact Sulaiman Al Jamoudi by email (ml14saya@leeds.ac.uk) or by mobile on 93536010, or email my supervisors: Dr Michael Wilson (M.D.Wilson@education.leeds.ac.uk) or Dr Michael Inglis (M.Inglis@leeds.ac.uk)

If you would like to participate in the research, please fill in the approval form. I would like to thank you for making this time available.

Yours sincerely,

Sulaiman Al Jamoudi

PhD Student, University of Leeds

Email: ml14saya@leeds.ac.uk

Appendix H: PARTICIPANT CONSENT FORM

A critical evaluation of in-service professional development programmes for novice science teachers: Omani stakeholders' perspectives

Name of Researcher: Sulaiman Al Jamoudi

Please tick (√) if you agree to participate.

I confirm that I have read the information provided to me about the research project mentioned above and understood it and that I am ready to participate in it.	
I know that the aim of this research is to evaluate in-service training programmes offered to novice science teachers in Oman.	
I understand that I will provide information about my personal experience and my views about the professional development of novice science teachers by questionnaire/interview.	
I realise that the interview will take 60 minutes (one interview for each key stakeholder and follow-up interviews for some novice science teachers.	
I know that I can withdraw from participation in the study at any time during data collection.	
I agree that the interview will be audio recorded and that the data contained in these recordings shall be used for research purposes.	
I understand that the data I will provide will be stored in a secure and password-protected location by the researcher (Sulaiman Al Jamoudi).	
I know that my MoE workplace will not be identifiable in any written report.	
I agree that the data I have provided to the researcher may be used in other research within the next three years.	
I have no objection to the data I provide to the researcher being used in joint research at the University of Leeds.	

Name of participant: _____

Signature: _____ Date: _____

Appendix I: Ethical review form

The Secretariat

University of Leeds

Leeds, LS2 9JT

Tel: 0113 343 4873

Email: ResearchEthics@leeds.ac.uk

UNIVERSITY OF LEEDS

Sulaiman Al Jamoudi

School of Education

University of Leeds

Leeds, LS2 9JT

ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee

University of Leeds

8 January 2021

Dear Sulaiman

Title of study: **A critical evaluation of in-service professional development programmes for novice science teachers: Omani stakeholders' perspectives**

Ethics reference: **AREA 17-001**

I am pleased to inform you that the above research application has been reviewed by the ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee and following receipt of your response to the Committee's initial comments, I can confirm a favourable ethical opinion as of the date of this letter, with the following provisos.

- the researcher gives the participants a specific date after which they cannot withdraw their data, once the researcher knows when the data collection will be completed;
- the researcher considers ways for the participants to comment on the data, either the transcripts or the analysis/ findings.

The following documentation was considered:

Document	Version	Date
AREA 17-001 Al-Jamoudi Ethical_Review_Form_V2.SEPT.2017.doc	2	05/09/17
AREA 17-001 to whom it may concern.pdf	1	10/08/17
AREA 17-001 Participant information sheet for the study.docx	1	10/08/17
AREA 17-001 PARTICIPANT CONSENT FORM.docx	1	10/08/17
AREA 17-001 Questionnaire targeting novice science teachers.docx	1	10/08/17
AREA 17-001 Questionnaire targeting stakeholders.docx	1	10/08/17
AREA 17-001 Semi-structured interview schedule for officials at the Ministry's centre and officials at the governorates.docx	1	10/08/17
AREA 17-001 Semi-structured interview schedule for the stakeholders (Supervisors, Senior science teachers and trainers).docx	1	10/08/17

AREA 17-001 Semi-structured interviews for novice science teachers.docx	1	10/08/17

Please notify the committee if you intend to make any amendments to the information in your ethics application as submitted at date of this approval as all changes must receive ethical approval prior to implementation. The amendment form is available at http://ris.leeds.ac.uk/EthicsAmendment.

Please note: You are expected to keep a record of all your approved documentation and other documents relating to the study, including any risk assessments. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at http://ris.leeds.ac.uk/EthicsAudits.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie

Senior Research Ethics Administrator, the Secretariat

On behalf of Dr Kahryn Hughes, Chair, AREA Faculty Research Ethics Committee

CC: Student's supervisor(s)