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Exploring the Role of Collaborative Reflective Enquiry in Promoting Teacher Professional Development and Learning

A Mixed-methods Study of Teachers' Perspectives in Rural Sichuan Province, China

Exploring the Role of Collaborative Reflective Enquiry in Promoting Teacher Professional Development and Learning: A Mixed-methods Study of Teachers' Perspectives in Rural Sichuan Province, China

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Abstract

Teacher collaborative reflective enquiry is a job-embedded and collaborative approach to teachers' professional development and learning, which builds on their evidence-based enquiry about a shared problem of educational practice. Collaborative reflective enquiry can enable teachers to collaborate with each other, use research and evidence, and reflect deeply and critically on their professional practice for improving teacher and student learning. However, the theoretical foundations of collaborative reflective enquiry need to be strengthened and consolidated. Insufficient attention has been given to the context specificity of collaborative reflective enquiry. There is a lack of conceptual and empirical research on this topic in China.

Informed by complexity theory and framed within the frameworks of professional development and PLCs, the concept of collaborative reflective enquiry is investigated in this study on the basis of teachers' perspectives to examine its role in promoting their professional development and learning in a rural district of Sichuan Province, China. This study explores the nature, extent, concept, typical features and perceived benefits of collaborative reflective enquiry, and the challenges and strategies for teachers' collaborative reflective enquiry in rural Sichuan Province, China. A sequential mixed methods design has been employed to collect survey data from 355 teachers in three secondary schools of rural Sichuan. The survey data has been complemented by interview data from 14 teachers. The survey findings of this study have suggested teachers' generally positive responses towards their participation in their professional development, PLCs and collaborative reflective enquiry practices. In terms of collaborative reflective enquiry, the survey findings have indicated a need for promoting teachers' "use of research and evidence" in relation to evaluating their professional development activities, reading relevant research literature, and looking outside the school for inspiration. Furthermore, the interview findings of this study have shown that collaborative reflective enquiry is understood as "to explore and research collaboratively for improving teaching and learning". The typical features of collaborative reflective enquiry are identified regarding focus on teaching and curriculum, relevance to student learning, formal and informal collaboration, collaborative and individual reflection, use of evidence and academic research, iterative process of enquiry, and leadership support. The challenges and strategies for teachers' collaborative reflective enquiry are outlined.

The research findings of this study have indicated the important role of collaborative reflective enquiry in promoting teachers' professional development and learning, thereby supporting the significance of collaboration, reflection and enquiry as key elements of professional development and PLCs. The study has challenged the typically Western approaches to promoting teachers' collaborative reflective enquiry and professional development in the literature within a context which is more structural and directive in nature. It advocates a hybrid approach to promoting teachers' professional development and learning in China which builds upon both bottom-up and top-down approaches. Particular attention needs to be given to the wider contextual, cultural, system-wide and other barriers to change on teachers' and schools' professional practice in China.

Keywords: Collaborative reflective enquiry; PLCs; teacher professional development

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Author's Declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Any views expressed in the dissertation are those of the author.

SIGNED: ..... DATE:.....

Table of Content

Abstract i

Acknowledgements ii

Author's Declaration iii

List of Tables viii

List of Figures x

List of Abbreviations xi

Chapter 1 Introduction 1

1.1 Introduction 1

1.2 Research Background: The Need for Promoting Teacher Professional Development and Learning through Collaborative Reflective Enquiry 2

1.3 Research Rationale 5

1.3.1 Academic Rationale: Ambiguity in the Focus of Collaborative Reflective Enquiry and its Purpose, and Insufficient Attention to Context Specificity 5

1.3.2 Local Rationale: A Lack of Conceptual and Empirical Research on This Topic in China 8

1.3.3 Personal Rationale: Professional Learning and Growth for Deeper Reflection on Professional Practice 10

1.4 Research Aims and Objectives 10

1.5 Research Questions 11

1.6 Overview of Conceptual Framework 11

1.7 Overview of Methodology 14

1.8 Summary 16

Chapter 2 Context 18

2.1 Introduction 18

2.2 Overview of Education System in China 18

2.2.1 Curriculum 19

2.2.2 Pedagogy 21

2.2.3 Assessment 22

2.2.4 Initial Teacher Education and Professional Development 23

2.2.5 Overview of Education in Sichuan Province 25

2.3 Policy Environment on Educational Quality and Equity in China: A Need for Improving Educational Quality and Narrowing Urban-rural Disparities through Strengthening Teacher Workforce 27

2.3.1 "Decision on Deepening Education Reform and Promoting Quality Education, 1999" 29

2.3.2 "Decision on Basic Education Reform and Development, 2001" 30

2.3.3 "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)" 31

2.3.4 "Opinions on Strengthening Teacher Workforce, 2012" 32

2.3.5 "Opinions on Deepening Teacher Education Reform, 2012" 32

2.4 Geographic Context on Rural Education in China: Attention to Participation, Equity and Processes of Change with External Support 34

2.5 Summary 35

Chapter 3 Literature Review of Teacher Professional Development, PLCs and Collaborative Reflective Enquiry 36

3.1 Introduction 36

3.2 Complexity Theory and Teacher Professional Development 37

3.3 Educational Quality and Effectiveness 39
3.3.1 Educational Quality 40
3.3.2 Educational Effectiveness 41
3.3.3 Key Findings of Educational Quality and Effectiveness That Are Relevant to Teacher Professional Development 46
3.4 Current State of Teacher Professional Development Internationally: High Quality Teacher Professional Development, Its Impact on Student Achievement, and Supporting Conditions 48
3.4.1 What Are the Characteristics of High Quality Teacher Professional Development? 49
3.4.2 What Is the Impact of Teacher Professional Development on Student Achievement? 52
3.4.3 What Are the Supporting Conditions for High Quality Teacher Professional Development? 54
3.5 Current State of PLCs Internationally: The Significance of Collaboration and Enquiry 55
3.5.1 What Is the Definition of PLCs? 56
3.5.2 What Are the Features of PLCs? 57
3.5.3 What Is the Impact of PLCs on Student Achievement? 60
3.6 Collaborative Reflective Enquiry: Why Are the Three Elements of Collaboration, Use of Research and Evidence, and Reflection a Specific Focus for This Study? 60
3.6.1 Why Collaboration? 61
3.6.2 Why Use of Research and Evidence? 62
3.6.3 Why Reflection? 66
3.7 Current State of Collaborative Reflective Enquiry Internationally: Definition, Features and Perceived Benefits 68
3.7.1 What Is the Definition of Collaborative Reflective Enquiry? 69
3.7.2 What Are the Features of Collaborative Reflective Enquiry? 70
3.7.3 What Are the Perceived Benefits of Collaborative Reflective Enquiry? 72
3.8 Current State of Teacher Professional Development, PLCs and Collaborative Reflective Enquiry in China: A Need for Creating Supporting Conditions and Strengthening Teachers' Professional Capacity in Collaboration, Reflection and Enquiry 76
3.8.1 Teacher Professional Development in China 76
3.8.2 PLCs in China 83
3.8.3 Collaborative Reflective Enquiry in China 87
3.9 Summary 88

Chapter 4 Methodology 90
4.1 Introduction 90
4.2 Philosophical Approach to Research Design 91
4.3 Research Design and Methodology 94
4.4 Research Methods 96
4.5 Development of Research Instruments 97
4.5.1 Teacher Questionnaire 98
4.5.2 Interview Schedule 105
4.6 Data Sampling 107
4.7 Data Collection 109
4.7.1 Quantitative Data Collection 109
4.7.2 Qualitative Data Collection 109
4.8 Data Analysis 110
4.8.1 Survey Analysis 111
4.8.2 Interview Analysis 112
4.9 Validity, Reliability and Trustworthiness 113
4.9.1 Validity and Reliability of the Survey 114
4.9.2 Trustworthiness of the Interviews 115
4.10 Ethical Issues 116

4.11 Methodological Limitations 117
4.12 Summary 119

Chapter 5 Quantitative Findings 120
5.1 Introduction 120
5.2 RQ1. To What Extent Do Teachers in Three Secondary Schools of Rural Sichuan Province, China Report Engagement in Professional Development, PLCs and Collaborative Reflective Enquiry? Are There Any Differences in Teachers' Responses According to Factors of School and Teacher Experience? 121
5.2.1 Teacher Professional Development 121
5.2.2 PLCs 127
5.2.3 Collaborative Reflective Enquiry 136
5.3. Summary 146

Chapter 6 Qualitative Findings 148
6.1 Introduction 148
6.2 RQ2. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Concept, Typical Features and Perceived Benefits of Collaborative Reflective Enquiry and the Challenges for Their Collaborative Reflective Enquiry Practices? 148
6.2.1 Concept: To Explore and Research Collaboratively for Improving Teaching and Learning 148
6.2.2 Typical Features: Focus on Teaching and Curriculum, Relevance to Student Learning, Formal and Informal Collaboration, Collaborative and Individual Reflection, Use of Evidence and Academic Research, Iterative Process of Enquiry, and Leadership Support 150
6.2.3 Perceived Benefits: Enhancing Teachers' Mutual Learning and Reflective Thinking, Improving Teaching Practices, and Strengthening Their Capacity Building 162
6.2.4 Challenges: A Lack of Genuine Collegiality, Superficial Reflection, Less Active Engagement in Academic Research, and Preference for Conventional Teaching Practices 163
6.3 RQ3. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Strategies That Could Improve Their Collaborative Reflective Enquiry Practices? 168
6.3.1 Providing Teachers with More External Training Opportunities and Funding 168
6.3.2 Encouraging More Informal and Genuine Teacher-to-Teacher Collaboration, Promoting School-to-School Collaboration for External Expertise, Supporting Research Engagement, and Maintaining Mentoring and Coaching 170
6.3.3 Incentivising Teachers' Participation in Collaborative Reflective Enquiry and Professional Development and Linking It to Teachers' Job Title and Pay 172
6.3.4 Enhancing Teachers' Commitment and Passion towards Teaching as a Profession 174
6.4 Summary 175

Chapter 7 Discussion 177
7.1 Introduction 177
7.2 Summary of Key Findings 177
7.2.1 Key Findings of RQ1. To What Extent Do Teachers in Three Secondary Schools of Rural Sichuan Province, China Report Engagement in Professional Development, PLCs and Collaborative Reflective Enquiry? Are There Any Differences in Teachers' Responses According to Factors of School and Teacher Experience? 177
7.2.2 Key Findings of RQ2. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Concept, Typical Features and Perceived Benefits of Collaborative Reflective Enquiry and the Challenges for Their Collaborative Reflective Enquiry Practices? 185
7.2.3 Key Findings of RQ3. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Strategies That Could Improve Their Collaborative Reflective Enquiry Practices? 193

7.3 Discussion of Key Findings 194
7.3.1 Further Research is Needed to Investigate the Focus of Collaborative Reflective Enquiry and Its Purpose 194
7.3.2 More Informal and Genuine Collaboration Needs to Be Encouraged by School Leaders and LEAs for Facilitating a Balanced Approach to Teachers' Collaborative Reflective Enquiry and Professional Development 195
7.3.3 More External Expertise is Needed for Teachers' Collaborative Reflective Enquiry and Professional Development to Stimulate New Ideas about Their Beliefs and Practices 197
7.3.4 More Incentives and Entitlement Need to Be Provided by School Leaders and LEAs for Enhancing Teachers' Commitment and Passion Towards Teaching as A Profession 198
7.4 Summary..... 199

Chapter 8 Conclusions 201
8.1 Introduction..... 201
8.2 Main Contributions 201
8.3 Implications for the Theoretical Literature 204
8.4 Implications for Policy and Practice..... 207
8.5 Limitations of the Study..... 209
8.6 Future Research 211

References 214

Appendix 1. Letter of Introduction 232

Appendix 2. Information and Consent Form 233

Appendix 3. GSoE Research Ethics Form.....235

Appendix 4. Survey Instrument.....238

Appendix 5. Sources of Survey Instrument 249

Appendix 6. Technical Details of Factor Analysis on Collaborative Reflective Enquiry.....252

Appendix 7. Summary of Raw Data – Quantitative 254

Appendix 8. Two-way ANOVA Results (Items by School & Teacher Experience) 263

Appendix 9. Two-way ANOVA Results (Scales by School & Teacher Experience).....268

Appendix 10. Results on the Scales of Research Engagement.....271

Appendix 11. Interview Schedule 273

Appendix 12. Examples of Qualitative Themes and Quotes.....276

List of Tables

Table 1. Components of Written Exam for the Teacher Qualification Test for Primary and Secondary Schools 24
Table 2. Key Policies Related to Issues of Educational Quality and Equity and Teacher Professional Development in China 27
Table 3. Models of Teacher Effectiveness and Effective Teaching 44
Table 4. Characteristics of High Quality Teacher Professional Development 49
Table 5. Features of PLCs 57
Table 6. Research Design 91
Table 7. Rationale for Mixed Methods Approach 95
Table 8. Aspects of Teacher Professional Development 99
Table 9. Measurement of PLCs 99
Table 10. Elements of Collaborative Reflective Enquiry 102
Table 11. Measurement of Research Engagement 104
Table 12. Interview Questions Related to the Key Aspects of Collaborative Reflective Enquiry 106
Table 13. Sampling Criteria for Schools 107
Table 14. Sampling Criteria for Teachers 108
Table 15. Methods of Data Collection 109
Table 16. Methods of Data Analysis 110
Table 17. Framework for Survey Replication 115
Table 18. Teachers' Participation in Professional Development: Three Items with the Highest/Lowest Mean and Standard Deviation 121
Table 19. Teachers' Participation in Professional Development: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests 122
Table 20. Impact of Professional Development: Three Items with the Highest/Lowest Mean and Standard Deviation 125
Table 21. Impact of Professional Development: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests 126
Table 22. Deprivatised Practice: All Items with Percentages 128
Table 23. Deprivatised Practice: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests 129
Table 24. Collective Focus on Student Learning: All Items with Means and Standard Deviations 130
Table 25. Collective Focus on Student Learning: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests 131
Table 26. Reflective Dialogue: All Items with Means and Standard Deviations 132
Table 27. Reflective Dialogue: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests 133
Table 28. Shared Sense of Purpose: Both Items with Means and Standard Deviations 135
Table 29. Shared Sense of Purpose: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests 135
Table 30. Collaboration: All Items with Means and Standard Deviations 137

Table 31. Collaboration: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests.....138
Table 32. Use of Research and Evidence: Three Items with the Highest/Lowest Mean and Standard Deviation 139
Table 33. Use of Research and Evidence: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests.....140
Table 34. Reflection: Three Items with the Highest Mean and Standard Deviation.....141
Table 35. Reflection: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests 142
Table 36. Research Engagement: Scales with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests.....145

List of Figures

Figure 1. Conceptual Framework of Collaborative Reflective Enquiry 12
Figure 2. The Map of China 26
Figure 3. Three Elements of Collaborative Reflective Enquiry 61
Figure 4. Revised Conceptual Framework of Collaborative Reflective Enquiry 89

List of Abbreviations

BERA	British Educational Research Association
CPD	Continuing Professional Development
DfE	Department for Education
DfEE	Department for Education and Employment
DfES	Department for Education and Skills
DfID	Department for International Development
EEF	Education Endowment Foundation
EFA	Education for All
EPLC	Effective Professional Learning Communities
ESRC	Economic and Social Research Council
GSCF	Gansu Survey of Children and Families
GTCe	General Teaching Council for England
ICT	Information and Communications Technology
ISTOF	International System for Teacher Observation and Feedback
ITDEQC	Improving Teacher Development and Educational Quality in China
LEAs	Local Education Authorities
MDGs	Millennium Development Goals
NCSL	National College for School Leadership
NFER	National Foundation for Educational Research
OECD	Organisation for Economic Co-operation and Development
Ofsted	Office for Standards in Education, Children's Services and Skills
PISA	Programme for International Student Assessment
PLCs	Professional Learning Communities
SDGs	Sustainable Development Goals
TALIS	Teaching and Learning International Survey
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UoB	University of Bristol
VITAE	Variations in Teachers' Work, Lives and Effectiveness

Chapter 1 Introduction

1.1 Introduction

> "…I think enquiry means to *tansuo* (explore) and *yanjiu* (research) something. It is about conducting research on teaching and learning, a way of innovation. The Collective Lesson Planning in my school can be a form of teacher collaborative reflective enquiry but is only about basic research on classroom management and the delivery of the curriculum etc…However, I think the word enquiry carries a meaning that is even deeper. What we do as teachers on a daily basis is just about discussions, but enquiry means to explore something deeper…" [1]

This study aims to explore the role of "collaborative reflective enquiry" [2] in promoting teachers' professional development and learning in a rural district of Sichuan Province, China. It is an exploratory mixed methods study that investigates the views of Chinese secondary school teachers on the nature, extent, concept, typical features and perceived benefits of collaborative reflective enquiry in a rural district of Sichuan Province, China. In particular, this study seeks to identify the challenges for teachers' collaborative reflective enquiry and to outline strategies that could improve their collaborative reflective enquiry practices in rural Sichuan Province, China.

The concept of collaborative reflective enquiry has been investigated in this study through a sequential mixed methods approach which includes both teacher survey and interviews to address three research questions (RQs 1, 2 and 3). Survey data has been collected to address RQ1 regarding the nature and extent of teachers' collaborative reflective enquiry in a rural district of Sichuan Province, China, along with their professional development and Professional Learning Communities (PLCs) practices. The survey scales of collaborative reflective enquiry regarding "collaboration, use of research and evidence, and reflection" are created based on previous research via factor analysis. Interview data has been collected to complement the survey data and address RQ2 regarding the concept, typical features, and

[1] This quote is extracted from the interview data of this study.

[2] The term of "collaborative reflective enquiry" is used in this study to combine the elements of collaboration, reflection and enquiry. It is based on the concept of "collaborative enquiry/inquiry" that is often used in the literature, and incorporates more explicitly an element of reflection. Collaborative reflective enquiry has been used consistently throughout the thesis.

perceived benefits of rural Chinese teachers' collaborative reflective enquiry, as well as the challenges. The interview data has also been collected to address RQ3 relating to the strategies that could improve teachers' collaborative reflective enquiry practices. The teacher interviews used for RQs 2 and 3 have a stronger focus on collaborative reflective enquiry.

1.2 Research Background: The Need for Promoting Teacher Professional Development and Learning through Collaborative Reflective Enquiry

Teacher professional development is about developing teachers' knowledge, skills and character dispositions required for effective teaching (Schleicher, 2016). Effective professional development of teachers can contribute to the improvement of teacher professionalism and high-quality of teaching and learning (OECD, 2016b; UNESCO, 2004, 2014). Internationally, there is a growing discourse shift of teacher professional development from professional development to professional *learning* (Kennedy, 2016; Opfer & Pedder, 2011; Webster-Wright, 2009). The focus of teacher professional development has been shifting from delivering and evaluating professional development programmes to *understanding* and *supporting* teacher professional learning (Opfer & Pedder, 2011; Schleicher, 2016; Webster-Wright, 2009). Therefore, it is important to understand how teacher professional development and learning could be supported both formally and informally.

Collaborative reflective enquiry is a job-embedded and collaborative model that focuses on teachers' evidence-based enquiry about a shared problem of professional practice (Butler & Schnellert, 2012; Harris & Jones, 2012; Robinson et al., 2010; Stoll, Harris, & Handscomb, 2012; The Ontario Ministry of Education, 2010, 2014). It can promote authentic professional learning and has been used as a useful approach to improving teachers' professional development, especially in terms of enabling teachers to enquire collaboratively about their day-to-day professional practice and examine beliefs and experiences, drawing on evidence (Katz & Earl, 2010; T. Nelson & Slavit, 2008; Stoll et al., 2012; The Ontario Ministry of Education, 2010; Timperley, Wilson, Barrar, & Fung, 2007). In essence, collaborative reflective enquiry is intertwined with the concept of PLCs, due to its emphasis on collaboration, reflection and enquiry (Bolam et al., 2005; OECD, 2016b). It aligns with an international

growing consensus on teacher professional development that "the most effective professional learning takes place at school level as teachers collaboratively engage in planning, assessing and evaluating student progress, innovation and reflection" (Reid & Kleinhenz, 2015, p. 7). Therefore, it is vitally important to explore the concept of collaborative reflective enquiry and investigate its role in promoting teacher professional development and learning.

However, this topic has been under researched in China. There is arguably a lack of conceptual and empirical research on the concept of collaborative reflective enquiry in the Chinese context. Little research regarding this concept and its role in promoting teacher professional development and learning has been conducted in China. Yet, the relevance of collaborative reflective enquiry to the Chinese context can be evidenced by some emerging PLCs literature in China (Qiao, Yu, & Zhang, 2018; Thomas, Peng, & Triggs, 2017; Thomas, Zhang, & Jiang, 2018), even to rural and poor areas of China (Sargent & Hannum, 2009).The relevance can be also evidenced by the findings of teacher professional development in China that teachers' professional capacity in enquiry and reflection needs building for enhancing their professional development and learning (Ding, Chen, & Sun, 2011; Thomas & Peng, 2014; Thomas et al., 2017). Thus, promoting and supporting teachers' collaborative reflective enquiry in the Chinese context could potentially facilitate the transformation of the role of the teacher in China from craftsmen to *teacher researchers* (*yan jiu xing jiao shi*) (Ding et al., 2011). Collaborative reflective enquiry could enable Chinese teachers, particularly with weaker competency, to work together, use research and evidence, and enquire more collaboratively about teaching and learning. Therefore, this study sets out to address this gap in the literature by conceptualising collaborative reflective enquiry within a Chinese context and to investigate its nature, extent, concept, typical features, perceived benefits, challenges and strategies from teachers' perspectives.

In this study, the working definition of collaborative reflective enquiry is adopted from what has been defined by the Ontario Ministry of Education, Canada as follows:

> "…a process in which participants come together to examine their own educational practice systematically and carefully using techniques of research. It may include as few

> as two educators or a group of several educators interested in addressing a school, department, division, or classroom issue driven by the consideration of student learning needs. Teams work together to narrow the question, gather and analyse evidence, determine action steps, and share their findings and recommendations." (Learning Forward Ontario, 2011, p. i).

This definition is chosen not only for its emphasis on collaboration, cyclical process of enquiry and systematic examination of research and evidence (Learning Forward Ontario, 2011; T. Nelson & Slavit, 2008), but also for its relative suitability to the Chinese context which is often structural and directive in nature. However, this does not mean that the concept of collaborative reflective enquiry itself is top-down, but instead it is arguably one that relates to the concept of PLCs and supports a bottom-up approach (Shen, Gao, & Xia, 2017). Hence, the definition of collaborative reflective enquiry in this study has been framed within the PLCs concept (Hord, 1997) and specifically conceptualised within the PLCs framework of the Effective Professional Learning Communities (EPLC)[3] project funded by the Department for Education and Skills (DfES), the General Teaching Council for England (GTCe) and the National College for School Leadership (NCSL) in the UK (Bolam et al., 2005). Thus, the concept of collaborative reflective enquiry is understood in this study based on the eight PLCs dimensions of *collaboration focused on learning*, *reflective professional enquiry*, shared values and vision, collective responsibility for pupils' learning, group as well as individual professional learning, openness, networks and partnerships, inclusive membership, mutual trust, respect and support (Bolam et al., 2005).

Overall, the originality of this study rests upon its original and significant contribution of new conceptual and empirical evidence from a developing country, China, to more Western based literature of collaborative reflective enquiry. This study addresses a gap in the literature that there is a lack of conceptual and empirical research into collaborative reflective enquiry in China, especially in terms of its role in promoting teacher professional development and learning. This study aims to conceptualise collaborative reflective enquiry within a Chinese context, and present an exploratory conceptual framework that could be useful to inform Chinese teachers' collaborative reflective enquiry practices. It seeks to conduct original empirical research drawing on new data collected from Chinese secondary school teachers.

[3] For details about the EPLC project, please visit: http://www.bristol.ac.uk/education/research/sites/eplc/

This study aims to explore the nature, extent, concept, typical features, perceived benefits of teachers' collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices, using the research context of rural Sichuan as an example. It seeks to build upon and tentatively refine and extend previous empirical evidence relating to collaborative reflective enquiry, PLCs and teacher professional development in China (Ding et al., 2011; Hannum, An, & Cherng, 2011; Li & Laidlaw, 2006; Qiao et al., 2018; Spires, Kerkhoff, & Fortune, 2019; Thomas & Peng, 2014; Thomas et al., 2017; Thomas et al., 2018).

1.3 Research Rationale

The overarching rationale of this study builds on a strong argument arising from the international literature that collaborative reflective enquiry can be employed as a useful *approach* to promoting teachers' PLCs, and PLCs can be used as an effective *organisational structure* for teacher professional development and learning (Bolam et al., 2005; DeLuca et al., 2015; Harris, Jones, & Huffman, 2017; Hord, 1997; J. B. Huffman et al., 2016; Katz & Earl, 2010; Learning Forward Ontario, 2011; T. Nelson & Slavit, 2008; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006; Stoll et al., 2012; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). In particular, this rationale draws upon the relevance of collaborative reflective enquiry to China, which is associated with the concept of PLCs (Qiao et al., 2018; Thomas et al., 2017; Thomas et al., 2018), and even to the resource-constrained Gansu Province of rural China (Sargent & Hannum, 2009). One key argument underpinning this study is that collaborative reflective enquiry could potentially enable rural Chinese teachers to collaborate with each other, conduct research into teaching and learning, and reflect deeply on their professional development and teaching practices. More specifically, the overarching rationale will be articulated through the following three perspectives: academic, local and personal.

1.3.1 Academic Rationale: Ambiguity in the Focus of Collaborative Reflective Enquiry and its Purpose, and Insufficient Attention to Context Specificity

The significance of collaborative reflective enquiry in promoting teacher professional development builds on its potential in facilitating teachers' authentic professional learning for enhancing teaching and learning. In this respect, T. Nelson and Slavit (2008) have argued, in terms of teacher professional development and learning, that collaborative inquiry rests upon three pillars important to the teacher change process:

> "(1) The construction of a high-functioning, collaborative teacher community; (2) The examination of beliefs and perspectives in the pursuit of a common vision of high quality learning and teaching; and, (3) An understanding of and ability to effectively move through an inquiry process in support of a collaboratively agreed upon goal." (T. Nelson & Slavit, 2008, p. 103).

However, literature on collaborative reflective enquiry has generally indicated an ambiguity in its focus and purpose, insufficient attention to context specificity and a lack of quantitative and mixed methods research on this topic. Further research is needed to contribute to the theoretical and empirical knowledge base of collaborative reflective enquiry (DeLuca et al., 2015). For example, the focus of collaborative reflective enquiry remains ambiguous in the literature, as different focuses of collaborative reflective enquiry have been found on students, teachers and schools. This ambiguity has influenced the framing, differentiation and use of this concept. Thus, it is not surprising that the concept of collaborative reflective enquiry has been used for different but overlapping purposes. For instance, the concept of collaborative reflective enquiry has been used for pedagogy and enquiry-based teaching/learning, with a focus of the enquiry on students (OECD, 2016a). It has also been used for teacher professional development, focusing the enquiry on teachers (T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). The concept of collaborative reflective enquiry has even been used for school improvement, with the focus of the enquiry on schools (Chapman, Chestnutt, Friel, Hall, & Lowden, 2016; Harris & Jones, 2012). Given that the focus of this study is on teacher professional development, the concept of collaborative reflective enquiry is therefore understood and used in terms of teachers' professional development and learning.

Moreover, evidence has indicated that insufficient attention has been given to the context specificity of collaborative reflective enquiry. There is little discussion in the literature as to

how collaborative reflective enquiry may be shaped by the aspects of context and shared focus and experiences in practice. The theoretical foundations of collaborative reflective enquiry need to be strengthened and consolidated, since existing research on collaborative reflective enquiry in the international literature tends to be highly practical (DeLuca et al., 2015; Harris & Jones, 2012; T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). Although the concept of collaborative reflective enquiry can be viewed as a form of "co-construction" or "co-regulation" from a socio-constructivist perspective (Butler & Schnellert, 2012; Schnellert, 2011), the purpose of such enquiry remains unclear, leading to an ambiguity in its use. Thus, further research is needed to explore the concept, features and impact of collaborative reflective enquiry (Butler & Schnellert, 2012; Butler, Schnellert, & MacNeil, 2015; DeLuca et al., 2015).

Furthermore, there is a lack of quantitative and mixed methods research on collaborative reflective enquiry. Existing evidence relating to collaborative reflective enquiry is methodologically qualitatively focused (e.g. case studies, interviews) (Butler & Schnellert, 2012; T. Nelson & Slavit, 2008; Sinnema, Sewell, & Milligan, 2011). More quantitatively oriented research on this topic is needed. Both quantitative and qualitative approaches could be combined for further deeper insights (DeLuca, Bolden, & Chan, 2017). More methodologically sound and robust research could be conducted to investigate collaborative reflective enquiry, especially its impact on teacher and student learning.

Therefore, this study sets out, on the basis of the above academic rationale, to conceptualise the concept of collaborative reflective enquiry within rural China by investigating its nature, extent, concept, typical features, perceived benefits, challenges and strategies. It aims to explore the role of collaborative reflective enquiry in promoting teachers' professional development and learning in a rural Chinese context. In particular, this study seeks to identify the challenges for collaborative reflective enquiry in this resource-constrained context and to outline strategies that could improve rural Chinese teachers' collaborative reflective enquiry practices. It employs a mixed methods approach, combining quantitative and qualitative methods, to the "measurement" and "interpretation" of the concept of collaborative reflective enquiry in a rural district of Sichuan Province, China.

1.3.2 Local Rationale: A Lack of Conceptual and Empirical Research on This Topic in China

Arguably, there is a lack of conceptual and empirical research on collaborative reflective enquiry in China. Collaborative reflective enquiry is an issue that has been under researched in the Chinese context, since very few studies can be found in existing literature, despite the huge landscape and widely varying local environments of China. New research is urgently needed for the theoretical and empirical knowledge base of collaborative reflective enquiry in the Chinese context, particularly in more rural disadvantaged contexts. The limited evidence regarding collaborative reflective enquiry in China seems only to indicate that collaborative reflective enquiry is useful in promoting teacher autonomy and student attitude and engagement (Li & Laidlaw, 2006; Spires et al., 2019).

More importantly, addressing issues around collaborative reflective enquiry, PLCs and professional development in China can contribute to the improvement of Chinese teachers' professionalism and teaching quality as well as educational quality and equity. For instance, improving teacher quality in China has been a key aspect that is outlined as one of the "guaranteeing measures" in the policy document "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)" (The Chinese Ministry of Education, 2010). For example, the importance of teacher quality in China can be illustrated as follows:

> "Teachers are the very basis of long-term education cause. Good teachers are critical for high-quality education. It is therefore essential to improve the status of teachers, safeguard their rights and interests, raise their salaries and benefits, and turn teaching into a respected occupation. It is also important to be strict with teachers' credentials, enhance virtue building among them, and strive to establish a well-structured and dynamic contingent of professional teachers of high calibre…with moral integrity and teaching expertise." (The Chinese Ministry of Education, 2010, p. 36)

Also, enquiry-based professional development has been advocated by Chinese authorities as one critical approach to teacher education and training in national policy documents. For example, enquiry has been mentioned in the policy document "Opinions on Deepening Teacher Education Reform" regarding the curriculum reform of teacher education and training (The Chinese Ministry of Education & National Development and Reform Commission

& Ministry of Finance, 2012). It is emphasised that various approaches to teacher training and development need to be promoted for improving the quality of teacher training, including enquiry-based, case-study-based, scenario-based and participatory professional development and so on. Enquiry-based professional development could potentially support teachers' professional learning in China.

In particular, the professional development of rural Chinese teachers has been promoted by the Chinese government to ensure the implementation of the policy "Opinions on Strengthening Teacher Workforce" (The Chinese State Council, 2012). Developing rural Chinese teachers professionally can contribute to the overall capacity building of the teacher workforce in China (The Chinese State Council, 2012). Rural teachers in China typically have weaker professional knowledge and skills than urban counterparts and consequently are more likely to have stronger needs for professional development (Ding et al., 2011; Thomas & Peng, 2014; Thomas et al., 2018). Rural teachers are also reported to hold lower expectations for students with disadvantaged backgrounds (e.g. "left-behind children") (Yiu & Adams, 2012). Furthermore, the quality of rural education in China can be affected by various poverty and contextual factors such as child nutritional status, household income, parents' education and attitudes towards children's education, and teachers' experience, which adds to the complexity of the rural educational context (Q. Chen, 2009; Zhao & Glewwe, 2010). The issue of urban-rural disparities in China is linked to a lack of funding, qualified teachers and teaching resources in the rural Chinese context (Brock, 2009; Dello-Iacovo, 2009; J. C.-K. Lee, Yu, Huang, & Law, 2016). Besides, the emotions, commitment, resilience, wellbeing and identity of rural Chinese teachers are reported to be experienced as difficult and an ongoing challenge (Gu, 2013; Tang, 2018). Hence, inequalities in educational opportunities between rural and urban students exist (Hannum et al., 2011). Gaps between rural and urban China in lower secondary school attainment remain (UNESCO, 2015).

Therefore, this study aims to explore the role of collaborative reflective enquiry in promoting teachers' professional development and learning in rural China. It seeks to provide new conceptual and empirical evidence to enable a better understanding of teachers' collaborative reflective enquiry in a rural Chinese context, thereby promoting teachers' professional development. New research is urgently needed to inform educational policy

priorities that will actively support Chinese teachers' professional development and learning, and to contribute to the implementation of reforms relating to better teacher quality and student learning outcomes.

1.3.3 Personal Rationale: Professional Learning and Growth for Deeper Reflection on Professional Practice

Collaborative reflective enquiry can be a useful concept in informing my professional learning and growth for deeper reflection on professional practice. As an English language teacher in the past, I understand the importance of enquiry and reflection in promoting teacher and student learning. If teachers are given the opportunity to enquire with and learn from experienced and/or excellent teachers, they could obtain new pedagogical content knowledge more effectively, in comparison to other learning approaches. Also, my professional experience as a teacher has left me an impression that Chinese teachers may generally focus more on teaching than on student learning. This is partly due to the explicit focus of the high-stakes assessment system in China on students' academic exam results, leading to teachers' heavy focus on how to *teach to the test* for better learning outcomes. Thus, despite the reform of the national curriculum which specifies broader learning outcomes beyond exam results, teachers' pedagogical approaches remain to a large extent unchanged. Therefore, based on my professional experience as a teacher as well as my personal understanding of the curriculum reform in China, it can be argued that Chinese teachers need to adopt new pedagogical approaches that could enhance broader student learning outcomes relating to mega-cognitive skills such as imagination, creativity, critical thinking and independent learning. However, in order to improve pedagogical approaches, teachers themselves need to advance their teaching philosophy, potentially through enquiring with teachers and/or experts either within their schools or outside.

1.4 Research Aims and Objectives

This study aims to explore the role of collaborative reflective enquiry in promoting secondary school teachers' professional development and learning in rural Sichuan Province, China. The research objectives are:

- To document and review the research context and broad policy environment on educational quality and equity and teacher professional development in China;
- To critically review international and local research evidence relating to professional development, PLCs and teacher collaborative reflective enquiry;
- To conduct an empirical study of teachers' views on the role of collaborative reflective enquiry in promoting their professional development at three secondary schools in rural Sichuan, in terms of the nature, extent, concept, typical features, perceived benefits, challenges and strategies;
- To consider the implications of the findings for related theoretical literature and make recommendations for future policy and practice in the Chinese context.

1.5 Research Questions

The research questions are as follows:

RQ1. To what extent do teachers in three secondary schools of rural Sichuan Province, China report engagement in professional development, PLCs and collaborative reflective enquiry? Are there any differences in teachers' responses according to factors of school and teacher experience?

RQ2. What are the views of teachers in three secondary schools of rural Sichuan Province, China on the concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges for their collaborative reflective enquiry practices?

RQ3. What are the views of teachers in three secondary schools of rural Sichuan Province, China on the strategies that could improve their collaborative reflective enquiry practices?

1.6 Overview of Conceptual Framework

A conceptual framework of collaborative reflective enquiry has been created to inform and guide the research design. This framework is grounded in three bodies of literature relating to teacher professional development, PLCs and collaborative reflective enquiry and focuses

particularly on collaborative reflective enquiry regarding collaboration, reflection and enquiry. The overall conceptual framework is as follows:

Figure 1. Conceptual Framework of Collaborative Reflective Enquiry

Firstly, the framework draws on literature on teacher professional development both internationally and in China to map out existing approaches to teachers' professional development and learning. It highlights the significance of PLCs in promoting teacher professional development and learning both formally and informally. One of the key findings in this regard points to a further need for exploring the role of PLCs as an effective organisational structure to support teacher professional learning, especially around collaboration, reflection and enquiry (Kennedy, 2016; Opfer & Pedder, 2011). Secondly, the framework builds upon the PLCs literature both internationally and in China to explore the role of PLCs in promoting teachers' professional development and learning, particularly in the rural Chinese context. One key argument relating to this is that the PLCs concept plays a significant role in diffusing the "pedagogical innovation" in China, even in resource-constrained areas of rural China (Hannum et al., 2011; Sargent, 2015; Sargent & Hannum, 2009). Thirdly, the framework draws on the collaborative reflective enquiry literature both internationally and in China to reflect the recognised importance of three key elements, collaboration, reflection and enquiry, in promoting PLCs and professional development. This indicates a need for further research to investigate teachers' collaborative reflective enquiry

in the Chinese context and to explore its potential in building the capacity of rural Chinese teachers for their professional learning and growth.

In terms of the key focus of this study on collaborative reflective enquiry, the elements of collaboration, reflection and enquiry are synthesised from existing teacher enquiry models to underpin the design of a relatively large-scale teacher survey. The evidence of the teacher survey is used to address RQ1 by providing an overview of teachers' collaborative reflective enquiry and their professional development and PLCs practices. The three elements of collaboration, reflection and enquiry are framed within the context of PLCs and conceptualised, in combination, as "collaborative reflective enquiry" that promotes teacher professional development and learning (OECD, 2009; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). For instance, collaboration is perceived as one core element of collaborative reflective enquiry due to its significant role in providing teachers with an effective mechanism for engaging in enquiry and reflection (A. Hargreaves, 2019; OECD, 2009, 2016b). It is one key PLCs dimension for teacher learning (Bolam et al., 2005). Reflection is regarded as another key element of collaborative reflective enquiry for its crucial role in bringing new knowledge and skills, and promoting self-awareness and deep learning (The Welsh Government, 2015). It is understood as "an ongoing, dynamic process of thinking honestly, deeply and critically about all aspects of professional practice" (Victorian Department of Education and Early Childhood Development, 2012, p. 3). Enquiry using research and evidence is a third key element of collaborative reflective enquiry. Enquiry supports teachers' *investigation* on student learning and can inform a rationale for their decision-making in selecting teaching approaches. Teachers can draw on various sources of information, both academic coded knowledge and tacit knowledge, to investigate student learning problems for the quality improvement of teaching and learning (Furlong et al., 2014). The different sources of information can be related to, for example, academic research, teacher experience, student performance data, information gathered through training or professional development, online evidence platforms or databases and external organisations (J. Nelson & O'Beirne, 2014).

More importantly, in order to provide evidence to address RQ2, an analytical framework for teacher interviews has been created and used to inform the design of the interview schedule

for investigating the concept, typical features, and perceived benefits of collaborative reflective enquiry as well as the challenges and strategies for collaborative reflective enquiry practices (DeLuca et al., 2017; Learning Forward Ontario, 2011; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). For example, the typical features of collaborative reflective enquiry are guided and analysed drawing on the collaborative reflective enquiry framework of the Ontario Ministry of Education, with enquiry being "relevant, collaborative, reflective, iterative, reasoned, adaptive and reciprocal" (The Ontario Ministry of Education, 2010, 2014). These characteristics are used to examine whether teacher enquiry is relevant to student learning, whether teachers collaborate with each other in a shared process, whether teachers reflect upon their own practice, and whether progressive understandings grow from cycles of enquiry (The Ontario Ministry of Education, 2010). They are also used to investigate whether analysis drives deep learning, whether enquiry can shape practice and in turn be shaped by practice, and whether theory and practice connect dynamically (The Ontario Ministry of Education, 2010). Moreover, the typical features of collaborative reflective enquiry are also analysed drawing on the enquiry framework of Timperley et al. (2007) regarding students' learning needs, teachers' learning needs, design of tasks and experiences, teaching actions and the impact of changed actions. These processes reflect the intrinsically cyclical nature of teacher enquiry (Timperley et al., 2007). In addition, the perceived benefits of collaborative reflective enquiry are considered from the perspectives of teacher and student learning, which build on the research findings of DeLuca et al. (2017). Besides, the strategies that could improve collaborative reflective enquiry practices are also analysed, on the basis of teachers' views, to address RQ3.

1.7 Overview of Methodology

A pragmatic philosophical approach has been employed to the research design of this study. This is because pragmatism is argued to be a philosophy that recognises the objective and subjective nature of reality, and emphasises the practical application of knowledge by testing and acting upon it in human experiences (Johnson & Onwuegbuzie, 2004; Morgan, 2014). Ontologically, pragmatism rejects the traditional dualism of positivism and interpretivism, and acknowledges both the nature of the outside world and the world of our conceptions (Johnson & Onwuegbuzie, 2004). It goes beyond to provide an approach that focuses on

obtaining evidence that is most useful to solve practical problems in society. Epistemologically, pragmatism rests upon the concept of "experience", based on which knowledge is generated through continuous interactions between beliefs and actions within a particular social context (Dewey, 1920, 1933; Morgan, 2014). Methodologically, pragmatism combines the strengths of quantitative and qualitative approaches and advocates the flexibility in methods choices for multiple ways of seeing and knowing (Greene, 2008; Johnson & Onwuegbuzie, 2004; Johnson, Onwuegbuzie, & Turner, 2007).

In this study, a sequential mixed methods approach (quan + QUAL) has been employed to address three research questions, with a quantitative approach complemented by the qualitative approach in the second phase (Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2006). The qualitative approach has the dominant status. This mixed methods approach has been used to investigate both the breadth and depth of the concept of collaborative reflective enquiry at three secondary schools in a rural district of Sichuan Province. The quantitative approach is used to collect data at a relatively large scale from a teacher survey regarding the nature and extent of teachers' professional development, PLCs and collaborative reflective enquiry practices in the three schools. The qualitative approach is employed, in greater depth, to gather data from semi-structured interviews on the views of these teachers on the concept, typical features and perceived benefits of collaborative reflective enquiry as well as the challenges and strategies for their collaborative reflective enquiry practices. The choice of the methods of teacher survey and interviews builds on the review findings of Bryman (2006) on mixed methods that survey research and semi-structured interviews are the predominant methods used in existing mixed methods research, which are also manageable within the scope and resources of PhD research. Thus, questionnaires have been administered to teachers (N=355) in three secondary schools of rural Sichuan, and semi-structured teacher interviews (N=14) have been conducted. Both findings of the survey and interviews are compared to previous research evidence both in China and internationally.

With regards to research instruments, collaborative reflective enquiry has been measured using survey items that build on previous research. Three scales of collaborative reflective enquiry regarding collaboration, use of research and evidence, and reflection are created via

factor analysis. Four items on collaboration have been replicated from the OECD Teaching and Learning International Survey (TALIS) teacher questionnaire (OECD, 2013) to measure the extent to which teachers collaborate with one another. The OECD survey instrument is chosen for its high validity and reliability across countries, and used to measure collaboration in a new context of rural Sichuan. Moreover, six items on use of research and evidence and seven items of reflection have been adapted from the prompts for reflective practice by the Welsh Government (The Welsh Government, 2015). The instrument of reflective practice by the Welsh Government is adapted in rural Sichuan as a baseline survey for testing out the instrument in a Chinese context in order to generate empirical evidence on Chinese teachers' practices in use of research and evidence and reflection. More importantly, the interview schedule which is informed by the overall conceptual framework has focused specifically on the three dimensions of collaboration, use of research and evidence, and reflection. It particularly centres on the key aspects of collaborative reflective enquiry in relation to the concept, typical features, perceived benefits, challenges and strategies. Overall, the combination of both survey and interview findings has facilitated a relatively more holistic view of teachers' collaborative reflective enquiry in the three schools of this study.

1.8 Summary

To conclude, the aim of the study is to explore the views of secondary school teachers on the role of collaborative reflective enquiry in promoting their professional development and learning in rural Sichuan Province, China. The objectives include an empirical study which aims to investigate teachers' views of the nature, extent, concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices in a rural Chinese context. The concept of collaborative reflective enquiry is investigated through a mixed-methods approach comprising both teacher survey and interviews.

Overall, this thesis will be presented in eight substantive chapters. Following this introductory chapter, Chapter 2 outlines the research context and broad policy environment of this study and highlights a need for improving teacher professional development, PLCs and collaborative reflective enquiry in China, particularly in rural China. Chapter 3 critically reviews key bodies

of literature in relation to teacher professional development, PLCs and collaborative reflective enquiry both internationally and in China, and presents a conceptual framework based on existing concepts and empirical evidence. Chapter 4 discusses and justifies the research design (mixed methods design), philosophical approach (pragmatism), methodology (sequential mixed methods approach), methods (teacher survey and semi-structured interviews), and data sampling, collection and analysis, along with discussions of ethical issues and methodological limitations. Chapters 5 and 6 present main findings of both quantitative and qualitative data analyses, addressing three research questions respectively. Chapter 7 discusses and contrasts key findings with previous research, and highlights core arguments arising from the findings. Chapter 8 concludes with the main contributions of this study, discusses the implications for theoretical knowledge and the recommendations for policy and practice, and ends with the limitations of the study and the suggestions for future research.

Chapter 2 Context

2.1 Introduction

This chapter provides an overview of the research context and broad policy environment for this study. It starts with a very brief introduction to the education system in China by focusing on three key elements of curriculum, pedagogy, and assessment, and on the initial teacher education and professional development in China and the education in Sichuan Province. The chapter then outlines chronologically key policy documents related to issues of education reform, education quality and equity and teacher professional development in the Chinese context. This approach is used to document and evidence the need for improving educational quality and narrowing urban-rural disparities through strengthening teacher workforce in China. Subsequently, this chapter highlights the geographic context of this study on rural education in China and particularly the necessity for participation, equity and processes of change with external support in rural China. The chapter ends with an argument relating to the need for improving educational quality and equity in China through promoting and supporting Chinese teachers' professional development and collaborative reflective enquiry.

2.2 Overview of Education System in China

Schooling in China consists of three years of pre-school (3-6 year olds), six years of primary school (6-12 year olds), three years of junior secondary school (12-15 year olds) and three years of senior secondary school (15-18 year olds). Students can continue to higher education either in universities for a four-year degree course or in vocational/technical colleges for a three-year diploma. According to the Compulsory Education Law of the People's Republic of China, the state adopts a nine-year compulsory education system (6-15 year olds), based on which all school-age children and adolescents have the right to access primary and junior secondary schooling for free, regardless of gender, ethnicity or religious beliefs (The Chinese Ministry of Education, 2006). It is also specified in the Article 3 of the Compulsory Education Law that

> "…In compulsory education, the State policy on education shall be implemented and quality-oriented education shall be carried out to improve the quality of education and

> enable children and adolescents to achieve all-round development - morally, intellectually and physically - so as to lay the foundation for cultivating well-educated and self-disciplined builders…with high ideals and moral integrity…" (The Chinese Ministry of Education, 2006)

Apart from the Compulsory Education Law, other laws that regulate the education system include Teachers Law (The Chinese Ministry of Education, 1994), Education Law (The Chinese Ministry of Education, 1995), Vocational Education Law (The Chinese Ministry of Education, 1996), Higher Education Law (The Chinese Ministry of Education, 1999), and Law on the Promotion of Non-public Schools (The Chinese Ministry of Education, 2003). Of these laws, the Teachers Law has been formulated for the purpose of safeguarding teachers' legitimate rights and interests.

2.2.1 Curriculum

In 2001, the policy document of "Guidelines on the Curriculum Reform of Basic Education in China" (The Chinese Ministry of Education, 2001) was proposed to outline approaches to the national curriculum reform in developing the course structures and content of basic education for a new national curriculum aimed for quality education. This policy document was designed to ensure the implementation of the policies of the "Decision on Deepening Education Reform and Promoting Quality Education" (The Chinese State Council, 1999) and "Decision on Basic Education Reform and Development" (The Chinese State Council, 2001) which will be articulated in a later section. Based on the Guidelines, a relatively comprehensive curriculum has been standardised at the state level and implemented at the provincial level, with an overarching goal of promoting quality education. For example, it has been specified in the Guidelines that the overall course structure of this curriculum includes subjects of primary, junior secondary and senior secondary schooling and can be adapted on the basis of local educational needs and decided by provincial Local Education Authorities (LEAs). Generally, the subjects of primary schooling include Morals and Life, Chinese, Mathematics, PE, Art/Music/Arts in lower grades and those plus Science, Foreign Languages and Practical Activities in higher grades (The Chinese State Council, 2001). The subjects of junior secondary schooling include Morals, Chinese, Mathematics, Foreign Languages, Science (Physics, Chemistry and Biology), History and Society/History/Geography, PE and

Health, Art/Music/Arts and Practical Activities (The Chinese State Council, 2001). The subjects of senior secondary schooling include Chinese, Mathematics, English plus either Science-based or Arts-based subjects (The Chinese State Council, 2001). Moreover, relevant curriculum standards have been developed at the national level for improving teaching and learning practices, used as guidelines for textbook development, teaching, student assessment and teacher evaluation. For instance, student assessment needs to focus on not only students' academic performance but also their potential in the development of their learning attitude, self, confidence and values and in all-around development (The Chinese Ministry of Education, 2001). Teacher evaluation needs to emphasise teachers' reflective teaching and self-evaluation (The Chinese Ministry of Education, 2001).

However, it has been argued that the state plays an important role in the reform of the curriculum making in China, especially in the social distribution of knowledge, skills and dispositions through curriculum making (Law, 2014). For example, it can be noticed that this curriculum covers pre-school, compulsory (primary and junior secondary) and senior secondary schooling, and involves reform in the goal of improving the curriculum, course structures, curriculum standards, teaching processes, textbook development and management, course evaluation, curriculum management, teacher training and development. It can be noticed that all these aspects have reflected a state-based curriculum making approach of the Chinese Government to addressing new economic, political and educational needs arising from globalisation and social change (Law, 2014).

In 2011, new curriculum standards for the compulsory schooling were established to ensure the implementation of the "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)" (The Chinese Ministry of Education, 2010). The standards for 19 subjects have been updated in total, including Chinese, Mathematics, English, Russian, Japanese, Physics, Chemistry, Biology, Science of Junior Secondary Schooling, Morals and Life, Morals and Society, Thought and Morals, History, History and Society, Geography, Arts, Art, Music, and P.E and Health. These new curriculum standards have reflected an increasingly stronger emphasis on students' skills, attitudes and values and a student-centred pedagogical approach. For example, the standards for the English subject focus on quality education and aim to demonstrate the value of language

learning on student development. These standards are designed for all students with different characteristics and individual differences, taking into account the progressiveness and continuity of language learning. The standards emphasise the learning processes and the practicality of language learning, and are designed to improve the evaluation and assessment of student learning, particularly in terms of students' comprehensive ability in English language use.

Nevertheless, given the different capacity of the LEAs and teacher training and development providers across regions, and the education disparities in urban and rural China, the reality in the implementation of the reform at the classroom level has been questioned (Law, 2014). For example, although it has been specified in the Guidelines that the implementation of the curriculum needs to be guided and inspected by LEAs, the capacity of these LEAs may vary, thereby influencing their capabilities in adjusting content, improving teaching, and facilitating reformative mechanisms. Also, it seems that insufficiently specific information is available for teacher training and development providers such as Normal Universities (Teacher Training Colleges) and other Higher Education Institutions to adjust their provision to the curriculum reform in its development goal, subject options, curriculum structures and pedagogies.

2.2.2 Pedagogy

In terms of pedagogy, some evidence has indicated that whole class interactive teaching, an emphasis on discipline, time on task and teaching to the test are effective teaching practices in China (Miao, Reynolds, Harris, & Jones, 2015; Teddlie & Liu, 2008). Other evidence has shown that the pedagogical approaches employed by Chinese teachers are especially linked to high quality instruction and classroom climate (Grant, Stronge, & Xu, 2013; Teddlie & Liu, 2008). The factors of maximisation of instructional time, various instructional activities, interactive time on task, effective classroom management skills and a good learning environment are identified to be conducive to optimal learning in China (Grant et al., 2013; Meng & Muñoz, 2016; Miao et al., 2015; Teddlie & Liu, 2008). Also, the teaching practices of Chinese teachers are likely to be affected by factors such as teacher qualification, motivation, commitment and expectations for students (Adams, 2012; Yiu & Adams, 2012).

However, it can be noticed that these effective practices in China indicate more traditional pedagogical beliefs of Chinese teachers and are linked to teachers' emphasis on a teacher-centred pedagogical approach associated with knowledge-based transmission (Fu, 2018). Given the examination-oriented and outcome-driven nature of educational system in China, teachers' pedagogical approaches may have been largely constrained by its national student assessment and teacher evaluation standards. Consequently, tensions have arisen between a teacher-centred pedagogical approach and the student-centred approach that has been advocated by the new curriculum reform (Fu, 2018; Peng et al., 2014; Schweisfurth, 2011; D. Wang, 2011; You, 2019). This student-centred pedagogical approach, with a focus on students' all-round development, may have challenged teachers' existing beliefs and practices. Therefore, there is a need for Chinese teachers to enhance their professional knowledge, skills and character dispositions for a stronger professional capacity in order to improve their teaching practices. To achieve this, Chinese teachers arguably need to find ways to develop themselves professionally, especially through a variety of approaches such as collaborative reflective enquiry, the focus of this study.

2.2.3 Assessment

In terms of national student assessment, there are two standardised exams following students' completion of junior secondary schooling at the age of 15 and senior secondary schooling at the age of 18. One is the exam at the end of junior secondary schooling called *zhong kao*, the Academic Test for Junior Secondary School Students, which is guided by the state and developed within each province. The other is the exam called *gao kao*, which is the National University Entrance Exam. In terms of *zhong kao*, results of the Programme for International Student Assessment (PISA) can to some extent indicate the extent of Chinese students' learning on a global scale. For example, the 2012 PISA results have shown that Shanghai and Hong Kong China are amongst the top five performers in Reading, Mathematics and Science (OECD, 2014a). However, it is worth noting that Shanghai (Municipality) and Hong Kong (Special Administrative Region) have special administrative status and are economically and educationally more developed than other parts of China. The education quality in both regions is higher than that of the rest of the country. Hence, the results based on Shanghai and Hong Kong data are more indicative.

With regard to *gao kao*, all senior secondary school students need to sit four exams in Chinese, Mathematics, English and Science/Arts. Science-based students need to sit exams in Chinese, Mathematics, English and Science (Physics, Chemistry and Biology) whereas Arts-based students need to sit exams in Chinese, Mathematics, English and Arts (Politics, History and Geography). Usually students enter senior secondary schools to study for one year and then progress to either Science-based or Arts-based pathways for two more years. However, students' *gao kao* results are high-stakes and can determine which universities students enter, and largely shape their life opportunities.

2.2.4 Initial Teacher Education and Professional Development

Typically, students wishing to enter the teaching profession in China need to complete a four-year BA degree course or a three-year diploma in Education. The course is usually structured with three or two years' studies at universities and some practical in local schools in final years. It is often offered by Normal Universities which are specialised in teacher training and professional development in China. The subjects offered usually include General Education, Morals and Education, History of Education, Philosophy of Education, Psychology of Education, Sociology of Education, Curriculum, Pedagogy, and Educational Statistics, Measurement and Evaluation. Students obtain initial teacher training both in theory and in practice, and usually get certified with qualified teacher status in their final years. However, it has been critiqued that the curriculum of the initial teacher education can be too theoretical in nature (Ren, 2010).

Besides, candidates without a degree or diploma in Education can also get certified if they pass the Teacher Qualification Test for Primary and Secondary Schools. The Teacher Qualification Test for Primary and Secondary Schools is standardised by the National Education Examinations Authority and administered at the provincial level. It applies to all candidates wishing to obtain qualified teacher status and is used to assess candidates' morality, qualities, teaching skills and their potential in professional development. Candidates can apply for the teacher certificates for pre-school, primary, junior secondary and senior

secondary schooling. The Teacher Qualification Test includes a written exam and an interview. The written exam includes the following:

Table 1. Components of Written Exam for the Teacher Qualification Test for Primary and Secondary Schools

Category	**Written exam**			**Interview**
	Subject 1	**Subject 2**	**Subject 3**	
Pre-school	Comprehensive qualities	Knowledge and skills in Early Years Education	---	Practical ability in education and teaching
Primary	Comprehensive qualities	Knowledge and ability in education and teaching	---	Practical ability in education and teaching
Junior secondary	Comprehensive qualities	Knowledge and ability in education	Subject knowledge and teaching skills	Practical ability in education and teaching
Senior secondary			Subject knowledge and teaching skills	Practical ability in education and teaching

(National Education Examinations Authority, 2020)

The interview is structured and scenario-based, and is conducted through lesson planning, mock teaching and oral examination. However, the question in this regard is that candidates are usually more test-driven, with insufficient attention to practical teaching skills.

In terms of teacher professional development, all teachers across different curriculum stages are required to take part in credit based training for more than 360 sessions every five years (The Chinese State Council, 2012). The Chinese government has been promoting and supporting professional training for pre-school, primary and secondary teachers, particularly for rural teachers, and has established online teacher PLCs for all teachers' independent learning and development (The Chinese State Council, 2012). Efforts are made to establish an open and flexible in-service teacher training system for primary and secondary teachers, with training delivered primarily by Normal Universities and supported by other Comprehensive Universities. However, in reality, the usefulness and practicality of the training provision has been questioned by frontline teachers, and teachers' practical skills need to be improved (Ding et al., 2011).

In addition, teachers' professional development is required to be guided by the Professional Standard for Secondary Teachers in China (The Chinese Ministry of Education, 2011). The professional development activities of Chinese teachers need to be aligned with the guiding

principles of the Professional Standard, which focus on students, prioritise teacher morality, emphasise teachers' professional competency and promote lifelong learning (The Chinese Ministry of Education, 2011). Teachers need to take responsibility to develop themselves in the areas of teaching philosophy and morality, professional knowledge and skills. However, the functioning of the Professional Standard for Secondary Teachers has been questioned as to whether it serves as a performance yardstick for teachers' induction, retention, training and evaluation in practice. Also, teachers' awareness of their professionalism has been argued to be comparatively weak and interpreted as "confined professionalism" (Lai & Lo, 2007).

2.2.5 Overview of Education in Sichuan Province

This study will be conducted in Sichuan Province, Southwest China. Sichuan Province is selected for this study due to convenience sampling which will be articulated in Chapter 4 Methodology. Sichuan is the 4th largest province in China and the largest provincial economy in Western China, surpassing 4 trillion CNY in GDP (6th in China) in 2019 (The National Bureau of Statistics of China, 2019). However, based on the 2019 GDP per capita of 55,774 CNY (8,085 USD), Sichuan Province only ranked the 18th amongst all 31 administrative divisions in mainland China (The National Bureau of Statistics of China, 2019). This means that the living standards of Sichuan Province are slightly lower than those of the average of China. In part, this is due to a vast number of population in Sichuan Province with over 80 million residents, of which 95% are Han Chinese followed by ethnic minority groups such as Yi, Tibetan, Qiang and so on. The Capital City of Sichuan Province is Chengdu, which is the hometown of pandas and famous for its food, culture, landscape and lifestyle.

Figure 2. The Map of China

Sichuan is one of the top ten provinces for education and has a lower rank in comparison to some other more internationally well-known municipalities and provinces such as Beijing, Shanghai, Jiangsu Province, Zhejiang Province and Guangdong Province etc. However, good education resources are usually more centralised in cities. For example, around 20 universities (not including vocational/technical colleges) are located in the Capital City of Chengdu, including the top 4 of Sichuan University, the University of Electronic Science and Technology of China, Southwestern University of Finance and Economics, and Southwest Jiaotong University, among others. In terms of secondary schooling, there are some high-performing schools in Sichuan Province, such as the top 3 secondary schools of Chengdu No 4, No 7 and No 9 state schools.

With regard to the “nine-year compulsory education” (6-15 year olds) in Sichuan Province, there were 9,574 schools in Sichuan Province in 2018, with over 8 million registered students and more than 500,000 school teachers (The Education Department of Sichuan Province, 2019). More specifically, there were 5,730 “primary schools” in Sichuan Province in 2018, with more than 5 million registered students and over 300,000 primary school teachers (The Education Department of Sichuan Province, 2019). There were 3,716 “junior secondary schools” in Sichuan Province in 2018. The total number of registered students in 2018 was more than 2 million, rising by 5.09%. The total number of junior secondary school teachers was over 200,000, rising by 1.79% (The Education Department of Sichuan Province, 2019).

Overall, until 2018, there have been over 20,000 education institutions (pre-schools, schools and universities), more than 15 million registered students, and over 900,000 teachers (school teachers and university academics) in Sichuan Province (The Education Department of Sichuan Province, 2019).

2.3 Policy Environment on Educational Quality and Equity in China: A Need for Improving Educational Quality and Narrowing Urban-rural Disparities through Strengthening Teacher Workforce

> "China is currently at a key stage for reform and development, as all-round progress is being made in economic, political, cultural and social development as well as in promoting ecological civilization. As industrialization, informatization, urbanization, marketization, and internationalization develop in depth, China is seeing increasing pressure from its vast population, limited natural resources, the environment, and its transformation of economic growth pattern. All those have highlighted the pressing need to enhance citizens' quality and cultivate innovative personnel. The future development and great rejuvenation of the Chinese nation are predicated on talents or professionals, and on education." (The Chinese Ministry of Education, 2010, pp. 5-6)

The research problem of this study on collaborative reflective enquiry and professional development is framed against policy documents related to issues of educational quality and equity and teacher professional development in China. A common theme relating to teacher professional development in China has been reflected across all the policy documents, which indicate a need for improving educational quality and narrowing urban-rural disparities through strengthening teacher workforce in the Chinese context. It can be argued that improving the quality of teachers' professional development and learning in China is key to the successful implementation of the core aims of the policies outlined in the documents below:

Table 2. Key Policies Related to Issues of Educational Quality and Equity and Teacher Professional Development in China

Policy	Year	Reference
Decision on Deepening Education Reform and Promoting Quality Education	1999	(The Chinese State Council, 1999)
Decision on Basic Education Reform and Development	2001	(The Chinese State Council, 2001)
Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)	2010	(The Chinese Ministry of Education, 2010)
Opinions on Strengthening Teacher Workforce	2012	(The Chinese State Council, 2012)
Opinions on Deepening Teacher Education Reform	2012	(The Chinese Ministry of Education & National Development and Reform Commission & Ministry of Finance, 2012)

Put simply, the policy document "*Decision on Deepening Education Reform and Promoting Quality Education, 1999*" has been formulated, since the establishment of the People's Republic of China in 1949 and particularly the implementation of the "Reform and Opening Up" policy in 1978, to address a need to establish a dynamic education system. This education system is aimed at supporting the development of talents and knowledge for the *kejiao xingguo* strategy (rejuvenating China through science and education) through deepening education reform and promoting quality education (The Chinese State Council, 1999). Then the "*Decision on Basic Education Reform and Development, 2001*" policy was initiated, in terms of improving basic education, tackling its unbalanced development and addressing its new challenges, to emphasise the fundamental role of basic education (The Chinese State Council, 2001). These two policy documents have outlined broad issues of educational quality and equity. Subsequently, the policy document "*Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)*" was formulated for the purpose of enhancing citizens' overall qualities and boosting educational development for human resources so as to make China a prosperous, strong, culturally advanced and harmonious modern country (The Chinese Ministry of Education, 2010). This reflects a "human capital" (Hanushek, 2013) development strategy of the Chinese Government for promoting education development and particularly quality improvement in China to cope with the 21st century challenges (Law, 2014). Following this Plan, the "*Opinions on Strengthening Teacher Workforce, 2012*" policy was specifically initiated with a focus on strengthening teacher workforce, adjusting the structure of the workforce, improving teacher management system and enhancing the attractiveness of teaching as a profession in rural China (The Chinese State Council, 2012). The issue relating to the development of rural Chinese teachers has been addressed in this policy document, and further efforts need to be made to build the capacity of the rural and overall teacher workforce in China. Then, the policy document "*Opinions on Deepening Teacher Education Reform, 2012*" has been formulated (The Chinese Ministry of Education & National Development and Reform Commission & Ministry of Finance, 2012), following the "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)" and the "Opinions on Strengthening Teacher Workforce, 2012". This policy document has outlined specific approaches to improving the quality of teacher education and strengthening teacher

workforce. More specifically, these policies will be articulated in the following section respectively.

2.3.1 "Decision on Deepening Education Reform and Promoting Quality Education, 1999"

The policy document "Decision on Deepening Education Reform and Promoting Quality Education" was formulated by the Chinese State Council in 1999 to address the need for advancing educational ideology, system, structure, content and pedagogical approaches and promoting *suzhi jiaoyu* (quality education) in China (The Chinese State Council, 1999). The Decision is aimed at promoting a more dynamic educational system that could enhance the qualities of Chinese citizens and cultivate all-round talents for knowledge economy and international competitiveness. For example, the Decision emphasises the development of students as "*aspirational, moral, educated and disciplined*" talents and the cultivation of students' creativity and practical abilities (The Chinese State Council, 1999). Students are expected to inherit the cultural traditions of the Chinese nation. The Decision focuses particularly on students' all-round development in their "*moral, intellectual, physical, aesthetic and labour development*" (The Chinese State Council, 1999). The moral development of students should be embedded in all subjects. It needs to link to students' daily life and social practice, and is expected to have a pragmatic effect on students themselves. The intellectual development of students needs to be supported by the quality improvement of teaching and learning, and demands advancement in teachers' educational ideology and philosophy. Teachers are encouraged to use a wide range of pedagogical approaches that could enable students to think independently and creatively. The physical development of students relies on the establishment of good learning environments in which students do exercise and keep healthy. The aesthetic development of students emphasises the cultivation of students' ability in appreciating art, and needs to be supported by more educational provision in arts and humanities subjects. The labour development of students focuses on the extent to which students could apply knowledge and skills in society through social practice. However, there are tensions between the educational reform and local practice, especially given the examination-oriented system in China (Y. Liu & Dunne, 2009). Improving student academic performance remains the top priority for schools, parents and students.

2.3.2 “Decision on Basic Education Reform and Development, 2001”

Following the “Decision on Deepening Education Reform and Promoting Quality Education, 1999”, another policy document “Decision on Basic Education Reform and Development” was formulated by the Chinese State Council in 2001 to outline six priorities for primary and secondary education reform (The Chinese State Council, 2001). These priorities include “ensuring the strategic position of basic education”, “*improving management system and funding and promoting the development of compulsory education in rural China*”, “deepening education and teaching reform and promoting quality education”, “improving teacher education system, deepening personnel reform and developing primary and secondary teaching force”, “reforming educational provision system and promoting the provision of social force”, and “strengthening leadership and encouraging social support for basic education reform and development” (The Chinese State Council, 2001). It can be noticed that all the aspects of basic education reform have reflected relevant supportive mechanisms and conditions that are conducive to the implementation of quality education reform in China. Indeed, basic education plays a fundamental role in improving the qualities of Chinese citizens, cultivating talents across different sectors and industries and at all levels, and promoting the modernisation of the Chinese society. Therefore, basic education needs to be prioritised as a key area for infrastructure and education development.

However, promoting the development of compulsory education in rural China has been a strategic task, which faces challenges in its weak foundation and unbalanced development, particularly in terms of education quality and equity (J. C.-K. Lee et al., 2016). Therefore, it is imperative for local governments to universalise compulsory education, meet the enrolment demands of junior secondary schooling and lower down the drop-out rates. For example, statistically, it has been set out in the policy document that the overall enrolment rate of junior secondary schooling is expected to increase to over 90%, with literacy rate over 95%. The enrolment rate of senior secondary schooling is expected to level up to 60%. Moreover, LEAs need to strengthen educational leadership, adhere to relevant laws and regulations, improve school inspection and emphasise family education. It is crucial to train more backbone teachers as models. Thus, improving teacher professional development can

contribute to the implementation of the basic education reform in China, particularly in the research context of this study, a rural district of Sichuan Province.

2.3.3 "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)"

The Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020) has been proposed more recently within a broader Chinese social context to re-address the crucial role of education reform and development. It is mentioned in the Outline that developing Chinese education plays an important role in promoting human resource development for meeting the increasingly demanding needs of the Chinese society. It has been highlighted that promoting educational equity and particularly equal access to education is a state policy priority that needs to be addressed in China. For instance,

> "…Equal access to education is a major cornerstone of social justice. Equal opportunities hold the key to equal access to education. The fundamental requirement of education equity is that all citizens have equal rights to receive education according to law. It is key to boost coordinated development of compulsory education, and to help and support the underprivileged. The fundamental way to achieve this is to allocate education resources reasonable, give preferences to rural, impoverished, remote and border areas and ethnic autonomous areas, and to bridge the gap in education development. To ensure equal access to education is and always has been a government responsibility, but it cannot be done without concerted public efforts." (The Chinese Ministry of Education, 2010, p. 8)

However, the policy priorities of improving educational quality and equity in China have been challenged by the lack of a highly skilled, innovative and versatile teaching workforce. This is partly due to inadequate education funding for demands, unequal distribution of education resources and uneven education development between urban and rural areas and across regions (Brock, 2009; J. C.-K. Lee et al., 2016). Therefore, there is an urgent need for promoting the professional development and learning of Chinese teachers to address the strategic themes of "prioritising moral education, emphasising capacity building, and promoting all-round development" mentioned in the Outline (The Chinese Ministry of Education, 2010). Consequently, the successful implementation of the strategic themes could contribute to the achievement of the Outline "strategic goals" in relation to quality, equity,

lifelong learning and system improvement (The Chinese Ministry of Education, 2010). For instance, promoting teacher quality and professional development is key to the quality of education modernisation and the improvement of students' moral conduct, scientific and cultural attainment and physical health in China (The Chinese Ministry of Education, 2010). Improving the quality of teacher workforce can ensure students' equal access to education and tackle urban-rural disparities, especially for children of rural migrant workers in cities and with disabilities. Qualified teachers can contribute to the provision of both academic and vocational education for students' lifelong learning, and most importantly, to the establishment of a vibrant, efficient, open and well adapted education system for building a moderately prosperous society in all aspects (The Chinese Ministry of Education, 2010).

2.3.4 "Opinions on Strengthening Teacher Workforce, 2012"

In line with the key priorities of the "Outline of China's National Plan for Medium and Long-term Education Reform and Development (2010 – 2020)", the policy document "Opinions on Strengthening Teacher Workforce" (The Chinese State Council, 2012) has been formulated to address more specifically the vital importance of teacher development in facilitating the implementation of the Outline. For example, it has been outlined in this policy document that teacher development needs to be promoted through innovating the mechanisms of teacher management and promoting teacher morality and professional competency (The Chinese State Council, 2012). A pressing need is to support improvements in the overall quality of teacher workforce, the optimising of the workforce structure and management, and *the professionalism of rural teachers*. One of the key tasks is to develop special policies, incentivise the mobility of high-calibre teachers in schools and facilitate more professional training opportunities for rural teachers. However, it has been argued that teachers' practical teaching skills are still weak (Ding et al., 2011).

2.3.5 "Opinions on Deepening Teacher Education Reform, 2012"

Subsequently, the policy document "Opinions on Deepening Teacher Education Reform" has been outlined to address an overarching strategic goal of deepening teacher education reform, promoting the capacity building of teacher education, improving the overall quality

of teacher education and cultivating high quality teacher workforce (The Chinese Ministry of Education & National Development and Reform Commission & Ministry of Finance, 2012). This document has detailed key strategies for reforming teacher education in China regarding developing an open and flexible teacher education system, raising teacher education standards, optimising teacher training system, reforming teacher education models, deepening the curriculum reform of teacher education, strengthening the workforce of teacher education, assessing the quality of teacher education and securing funding for teacher education (The Chinese Ministry of Education & National Development and Reform Commission & Ministry of Finance, 2012). For example, it has been advocated in this policy document, in terms of innovating teacher training models, that teacher training should satisfy the changing needs of teaching and learning. Different effective training approaches need to be employed to enhance the pertinence and practicality of teacher training, especially in rural schools, including exchange training, centralised training, school-based training and online training. A need for integrating Information Communications Technology (ICT) in teacher training is highlighted, together with establishing online teacher PLCs. Training abroad programmes are also encouraged in schools where resources are sufficient. However, the usefulness and practicality of the teacher education provision has been questioned by some teachers (Ding et al., 2011). Nevertheless, the approaches of exchange training, school-based and online PLCs training are closely linked to the focus of this study on collaborative reflective enquiry which essentially builds upon the concepts of PLCs and teacher professional development.

Overall, all these policies that have been promoting systemic and fast-changing curriculum reform and teacher professional development practices in China have directed teachers' attention to search for good practices to encounter curriculum reform changes (Lai & Lo, 2007; Law, 2014; Lo, Lai, & Wang, 2013; Paine & Fang, 2006; Wong, 2012). However, the implementation of these policies in practice has posed tensions and challenges to teachers' pedagogical practices, emotions, attitudes, identities, resilience and professionalism (Gu, 2013; Lo et al., 2013; Tan, 2016; Tan & Chua, 2015). Teachers need to stretch their professional capacity for improving *pedagogy* to, on the one hand, meet the demands for the new *curriculum* reform for student-centred quality education, and on the other hand, focus on students' academic results associated with the examination-oriented *assessment* system

(Y. Liu & Dunne, 2009; Lo et al., 2013). This key argument has significantly underpinned a broad contextual perspective of conceptualising and examining teacher collaborative reflective enquiry and professional development in this study.

2.4 Geographic Context on Rural Education in China: Attention to Participation, Equity and Processes of Change with External Support

Relevant to the broad policy environment on educational quality and equity, this section seeks to highlight the geographic context of this study on rural education in China. The rural context of this study has been chosen as an example to illustrate how collaborative reflective enquiry could be shaped by a resource-constrained context, thereby highlighting the challenges for teachers' collaborative reflective enquiry and professional development practices. The extent to which rural education is reformed in China is a key element of successful implementation of the policy documents mentioned in previous sections. Yet, some evidence has indicated that the school attainment gap between urban and rural China remains (UNESCO, 2015). Hence, efforts need to be made to tackle such disparities by focusing on participation, equity and processes of change on multiple levels with external support (Brock, 2009). This argument can be evidenced by the findings of a research project investigating approaches to rural education reform in Gansu Province, China as follows:

> "…rural education reform needs to be addressed on multiple levels at the same time; that attention to participation, equity and processes of change are as essential as technical reforms; and that external support is a necessary factor in unfreezing outdated practices, stimulating change and creating new models of practice…" (Brock, 2009, p. 454)

However, there are challenging contextual factors regarding rural education reform in China. For instance, rural education development has been challenged by factors of structural and funding inequalities, insufficient resources, a shortage of specialised teachers, and complex student and family background (low socio-economic status, left-behind children). It is also challenged by the tensions between a teacher-centred pedagogical approach with a traditional reliance on exam results and a student-centred pedagogical approach that focuses on skills and values as mentioned before (Q. Chen, 2009; Dello-Iacovo, 2009; Hannum et al., 2011; Peng et al., 2014; Zhao & Glewwe, 2010). Hence, strategies for improving educational

quality in rural China need to be addressed, potentially through providing better physical infrastructure and facilities for rural schools, enhancing the provision of human resources (e.g. more specialised teachers, principals and administrators), and facilitating high quality processes of teaching and learning in China. However, specifically in relation to this current project, improving strategies for collaborative reflective enquiry and teacher professional development could be a relatively effective lever to enhance the quality of rural education in China. Thus, the focus of this study is on the role of collaborative reflective enquiry in promoting teacher professional development in a rural Chinese context.

2.5 Summary

Overall, this chapter has outlined the research context and broad policy environment in China. The elements of curriculum, pedagogy, assessment of the Chinese education system have been discussed, along with a brief overview of initial teacher education and professional development in China and the education in Sichuan Province. The broad policy environment has been discussed chronologically, based on key policy documents that are related to education reform and development, quality, equity and teacher professional development in China. It can be argued that there is an urgent need to promote Chinese teachers' professional development and learning for improving educational quality and equity so as to facilitate the implementation of the policy documents mentioned in this chapter. More importantly, this chapter has highlighted the geographic context of this study on rural China, within which it is arguably essential to focus on participation, equity and processes of change with external support.

Chapter 3 Literature Review of Teacher Professional Development, PLCs and Collaborative Reflective Enquiry

3.1 Introduction

This chapter reviews three strands of literature in relation to teacher professional development, PLCs and collaborative reflective enquiry and presents an exploratory conceptual framework of collaborative reflective enquiry that informs the research design and methodology of this study. The overall approach that has been taken to reviewing the literature builds on an acknowledgement of both commonalities and differences of these three concepts across countries. These commonalities and differences are theoretically and empirically evidenced. Hence, this chapter will critically review international evidence of teacher professional development, PLCs and collaborative reflective enquiry first and subsequently discuss the evidence of these three concepts in China. Both international and local research evidence will be reviewed to develop the conceptual framework of collaborative reflective enquiry. Furthermore, the review of the literature builds upon an extended argument from previous research that collaborative reflective enquiry can be used as a useful *approach* to enhancing PLCs, and PLCs can be employed as an effective *organisational structure* to promote teacher professional development and learning (Harris et al., 2017; Hord, 1997; OECD, 2016b; Pang & Wang, 2016; Schleicher, 2016; Stoll et al., 2006; Stoll et al., 2012). It identifies relevant gaps in the literature, especially those addressed in this study regarding the lack of conceptual and empirical research on collaborative reflective enquiry in China.

Overall, this chapter starts with an overview of the current state of teacher professional development in the international context and highlights the significant role of PLCs in facilitating and supporting teacher professional development (Stoll et al., 2012). The chapter then critically reviews research evidence regarding PLCs internationally and focuses particularly on the importance of collaboration, reflection and enquiry as key tools to enhance PLCs practices (Bolam et al., 2005; Stoll et al., 2012). Consequently, the concept of collaborative reflective enquiry is framed under the PLCs framework, consisting of three key elements regarding collaboration, enquiry relating to use of research and evidence, and

reflection (DeLuca et al., 2017; Harris & Jones, 2012; Learning Forward Ontario, 2011; T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). The chapter subsequently reviews research evidence of collaborative reflective enquiry, with a focus on its definition, typical features and perceived benefits (DeLuca et al., 2017; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). It ends with a critical review of research evidence relating to teacher professional development, PLCs and collaborative reflective enquiry in China.

3.2 Complexity Theory and Teacher Professional Development

Complexity theory is used in this study as an overarching theory to underpin the complexity of understanding and investigating key concepts of educational/school/teacher quality and effectiveness, teacher professional development, PLCs and collaborative reflective enquiry as well as their interrelated relationships[4]. It provides perspectives from the broad field of educational leadership and management (Bush, 2015) as well as organisational studies (e.g. loose coupling) (Scheerens, 2015; Shen et al., 2017) to address teacher professional development and learning within enabling structures and cultural, social and contextual conditions that could shape teachers' day-to-day professional practice (Opfer & Pedder, 2011). Complexity theory builds on a logic of complexity as follows:

> "It uses the logic of complexity to argue for a different approach to managing organisations through the identification, development, and implementation of an enabling infrastructure, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form." (Mitleton-Kelly, 2003, p. 26).

Complexity theory is an interdisciplinary theory that builds on and enriches systems theory by articulating additional characteristics of complex systems (Burnes, 2005; Grobman, 2005). It draws on research in the natural sciences that examines uncertainty and nonlinearity, and has been applied as a way of understanding and changing organisations (Burnes, 2005; Grobman, 2005). The term "complex evolving systems" has been used by Mitleton-Kelly

[4] Complexity theory has been employed by H. Zheng (2013) in China to explore the dynamic and complex relationship between Chinese teachers' beliefs and practices.

(2003) to emphasise the inter-relationship and interdependence of complex systems, consisting of ten generic principles. These principles include self-organisation, emergence, connectivity, interdependence, feedback, far from equilibrium, space of possibilities, co-evolution, historicity & time and path-dependence. In particular, the principles of self-organisation, connectivity, interdependence, feedback together could potentially enable a better understanding of promoting teachers' professional development and learning through collaborative reflective enquiry within organisational forms such as PLCs.

Relevant to teacher professional development, complexity theory has been employed by Opfer and Pedder (2011) to develop their conceptual framework of teacher professional development and learning regarding three dimensions of "the teacher, the school and the learning activity". It has been argued that the interactions of these three dimensions can shed light on a better understanding of teacher professional development and learning:

> "To understand and explain why and how teachers learn, we must consider how teacher's individual learning orientation system interacts with the school's learning orientation system and how both of these systems together affect the activities (and features of activities) in which teachers participate and then are reciprocally affected by the changes that occur from participation in these activities" (Opfer & Pedder, 2011, pp. 393-394).

For example, in terms of teachers' individual learning orientation system, evidence from the 4-year "Variations in Teachers' Work, Lives and Effectiveness" (VITAE) project has illustrated key factors that are important for teachers' individual learning (Day et al., 2006). It is found that commitment and resilience are fundamental to teacher's effectiveness, and the variations in professional, personal and workplace conditions in different life phases affect these (Day & Gu, 2007). It is also found that professional learning opportunities need to be designed to enhance teachers' capacity in managing different personal, workplace and external scenarios which challenge their commitment to the core moral, ethical and instrumental purposes of teaching as a profession (Day & Gu, 2007; Day et al., 2006).

With regard to school's learning orientation system, evidence of the TALIS 2013 data has illustrated a link between school-level factors and teacher learning. For example, it is found that instructionally focused leadership in schools and teacher co-operation are associated

with higher levels of effective professional development participation and reported instructional impact (Opfer, 2016). It is also found that collaboration, content focus and leadership are crucial in improving teaching practices and student learning outcomes. Also, a positive link between school factors and teachers' professional development and learning has been found in the "Schools and Continuing Professional Development (CPD) in England – State of the Nation" project, which highlights the importance of school-level support in influencing teacher professional development (Opfer & Pedder, 2011; Opfer, Pedder, & Lavicza, 2011; Pedder, Storey, & Opfer, 2008). To some extent, these findings have reflected the importance of school-levels factors associated with PLCs in promoting teachers' professional development and learning.

As for the typical features of professional development activities, two types of teacher professional development activities are identified based on the findings of the TALIS 2013 data. One is "non-school embedded" activities such as courses and workshops, education conferences or seminars, qualification programmes and in-service training courses (Opfer, 2016). The other is "school embedded" activities such as participation in professional development networks, individual or collaborative research, mentoring or coaching and collaborative professional learning (Opfer, 2016). It is noticed that the school embedded activities are associated with effective PLCs features.

3.3 Educational Quality and Effectiveness

Given the close link of teacher professional development to the concepts of educational quality and effectiveness, it is important to discuss the nature, similarities and differences of these two concepts. This discussion will underpin a clearer differentiation in and understanding of research evidence and claims that are relevant to teacher professional development in the later sections of this chapter. Internationally, teacher professional development has been conceptualised as a crucial means to enhancing teacher, school and educational quality and effectiveness for educational reforms, changes and sustainability (European Union, 2010; OECD, 2005a, 2016b; UNESCO, 2004). Yet, the terms of quality and effectiveness have been used interchangeably in the international literature of schooling. There are similarities between these two concepts but also differences. The similarities are

that both of the concepts emphasise the measurement of student learning outcomes, which can indicate how well students learn. However, the concept of quality carries a broader meaning associated with the extent to which education achieves a wide range of personal, social and development goals as well as quality in other aspects such as processes or resources (UNESCO, 2004). The achievement of these goals and objectives is much more difficult to assess. The concept of effectiveness, situated in the educational/school/teacher effectiveness tradition, focuses explicitly on the effects of different education/school/teaching processes and other indicators on student achievement which is typically measured by student attainment.

3.3.1 Educational Quality

The discourse of educational quality has been driven and shaped by different international agendas. The concept of educational quality has been evolving from an initial focus on access and enrolment set in the World Declaration on Education for All (EFA) in 1990 to that on recognised and measurable learning outcomes, especially students' literacy, numeracy and essential life skills that are included in the Dakar Framework for Action in 2000 (UNESCO, 2000). Following the UN Millennium Summit in 2000, the Millennium Development Goals (MDGs) were established to focus on eight international goals by the year of 2015. The second MDGs international goal was to achieve universal primary education. More recently, the Sustainable Development Goals (SDGs) have been set up, with seventeen development goals. The fourth SDGs goal is explicitly about "quality education", i.e. ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all (United Nations, 2015). It is evident that educational quality as a fundamental determinant of enrolment, retention and achievement has become increasingly important internationally (UNESCO, 2004).

Crucially, although there is no single definition of educational quality, two principals have been acknowledged internationally to underpin the objectives of education (UNESCO, 2004). One is learner's cognitive development which can be used as an indicator for quality. The other is the role of education in promoting commonly shared values along with creative and emotional development (UNESCO, 2004). In the international context, a dominant model of

educational quality is the comprehensive UNESCO framework for defining and assessing educational quality. It is understood, monitored and improved through five key dimensions regarding "learner characteristics, context, enabling inputs, teaching and learning, and outcomes" (UNESCO, 2004). This model is outlined in the "EFA Global Monitoring Report 2005: The Quality Imperative" and covers interrelated components of an educational system. Importantly, the TALIS and PISA administered by the OECD (OECD, 2014a, 2014b) has drawn attention to a focus on different aspects of teaching and learning processes and, most importantly, the impact of these aspects on student achievement, particularly in Reading, Mathematics and Science. International comparative assessments such as TALIS and PISA are therefore used by policymakers across countries and economies for system outcome comparison and improvement.

However, there have been critics about such international comparative assessments of measuring and comparing system outcomes. For example, it has been critiqued that international comparative assessments can result in a range of unintended consequences such as the shaping and governing of school systems "by numbers" (Johansson, 2016) and the policy transfer and/or reactions of shifts in increasing demand for standardisation and accountability across education systems (Baird et al., 2016; Crossley, 2014; Crossley & Watson, 2009; Hopfenbeck et al., 2018). Also, the design and technical assumptions of such comparative assessment studies as well as the interpretations and use of assessment results are questioned (Goldstein, 2018). For instance, whether the item translation of instruments is culturally and linguistically equivalent and meaningful for all research participants is an issue that has been raised. Technically, this issue is related to the validity of the summary scales of measured constructs in reflecting the concept described by the label, and to the legitimacy of causal inferences that have driven policy changes (Goldstein, 2018).

3.3.2 Educational Effectiveness

Educational effectiveness is a term that is used more recently to represent the learning outcomes of the whole education system and levels within this (e.g. country, region, local authority, school and class), building upon the traditions of school and teacher effectiveness (Chapman et al., 2012; Chapman, Muijs, Reynolds, Sammons, & Teddlie, 2015; Reynolds et

al., 2014; Scheerens, 2001; Thomas, 2020). However, most commonly, the term effectiveness is focused on the effects of school-level and/or teacher-level indicators on student achievement, i.e. school/teacher effects. Overall, the characteristics of educational effectiveness research have been summarised by Chapman and colleagues as being associated with commitments to theory generation, methodological sophistication, the importance of the learning level and multiple levels, the measurement of multiple outcomes of education, and an outward facing discipline responding to criticism (Chapman et al., 2015). In terms of school effectiveness, a dominant definition of school effectiveness is stated as follows:

> "School effectiveness refers to the performance of the organisational unit called a 'school'. The performance of the school can be expressed as the output of the school, which in turn is measured in terms of the average achievement of the pupils at the end of a period of formal schooling." (Scheerens, 2000, pp. 18-21)

In particular, value-added measures of school effectiveness have been developed and used for the measurement of student achievement, alongside the school effectiveness research agenda (Goldstein, 1997; Mortimore, Sammons, & Thomas, 1994; Saunders, 1999; Thomas & Mortimore, 1996; Thomas, Peng, & Gray, 2007). The term "value-added" can be defined as follows:

> "A measure of pupil achievement which takes into account the effects of differential pupil inputs (i.e. entry qualifications). Pupil achievements thus conceived can be used to contribute to the evaluation of institutional quality in the teaching and learning functions." (Saunders, 1999, p. 12)

Value added measures of student progress are typically used to measure school and teacher effectiveness. The variation in value added measures of student progress is what one seeks to explain, using different process, input, context explanatory factors such as teaching approaches or teaching practices.

In terms of school effectiveness, there are two dominant models in the international literature. One is the context-input-process-output-outcome model of schooling proposed by Scheerens (1990). This model has underpinned a variety of school effectiveness studies which

examine the impact of different contextual, input and process indicators on school or student outcomes. The model has also been included in the review of school and instructional effectiveness research conducted by Scheerens (2005) for the background paper prepared for the "EFA Global Monitoring Report 2005: The Quality Imperative" (UNESCO, 2004). The other is the dynamic model of Creemers and Kyriakides (2006) which essentially extends the Scheerens (1990) and other related models and is used for modelling educational effectiveness. It focuses on how the process factors at classroom, school and system levels can be measured over time by five dimensions of frequency, focus, stage, quality and differentiation (Kyriakides & Creemers, 2008). Notably, this model of educational effectiveness has a stronger focus on the methods of measurement.

However, school effectiveness research has been critiqued for its political-ideological nature and purposes, and theoretical and methodological limitations (Elliott, 1996; Luyten, Visscher, & Witziers, 2005; Thrupp, 2001). For example, it has been critiqued that the assumptions underpinning school effectiveness research relate to the feasibility of examining objectivity in educational research, and distinguish between facts and values (Luyten et al., 2005). There is a need to reflect on the nature and purposes of schooling predominantly measured by the academic learning outcomes of teaching-learning processes and on the values behind such measurement (Elliott, 1996). Also, it is indicated that more "theory-driven" school effectiveness research should be conducted to explain relationships between school-level factors and student outcomes and more importantly to explore the explanations of why and how these factors are related (Luyten et al., 2005). In addition, it has been argued that the empirical-analytical methodological approach of school effectiveness research with a strong reliance on quantitative research methods ignores the values and life experiences of research participants and pays insufficient attention to the meanings given by the participants to different events (Luyten et al., 2005).

In terms of teacher effectiveness, different explanatory teaching process factors associated with school and teacher effectiveness measures have been identified and included in teacher effectiveness models (Anderson, 2004; Campbell, Kyriakides, Muijs, & Robinson, 2003; Y. C. Cheng, Tam, & Tsui, 2002; Creemers & Kyriakides, 2006, 2008; Day et al., 2006; DfEE, 2000; Klieme, Pauli, & Reusser, 2009; Kyriakides, Christoforou, & Charalambous, 2013; Muijs et al.,

2014; Scheerens, Luyten, Steen, & Luyten-de Thouars, 2007; Seidel & Shavelson, 2007; Teddlie, Creemers, Kyriakides, Muijs, & Yu, 2006; Van de Grift, 2007, 2014). The term of teacher effectiveness (Anderson, 2004; Campbell et al., 2003; Y. C. Cheng et al., 2002; Creemers & Kyriakides, 2006, 2008; Day et al., 2006; DfEE, 2000; Muijs et al., 2014) has sometimes been used interchangeably with teaching effectiveness (Scheerens et al., 2007; Seidel & Shavelson, 2007), effective teaching (Kyriakides et al., 2013; Teddlie et al., 2006) and teaching quality (Klieme et al., 2009; Van de Grift, 2007, 2014). Technically speaking, teacher effectiveness often refers to value added measures of student progress calculated at teacher level whereas effective teaching is typically related to teaching practices that are associated with better student outcomes and/or progress.

Table 3. Models of Teacher Effectiveness and Effective Teaching

Models	**Factors**	**Context**
The DfEE teacher effectiveness model (DfEE, 2000)	Professional characteristics; Teaching skills; Classroom climate	United Kingdom
Differential teacher effectiveness (Campbell et al., 2003)	Differences in activity; Differences in subjects; Differences in pupils' background factors; Differences in pupils' personal characteristics; Differences in cultural and organisational context	United Kingdom
The UNESCO model (Anderson, 2004)	Teacher characteristics; Student characteristics; Curriculum; Classroom; Teaching; Learning	International
Components of effective teaching (Teddlie et al., 2006)	Assessment and evaluation; Clarity of instruction; Classroom climate; Classroom management; Differentiation and inclusion; Instructional skills; Planning of single lessons; Long-term planning; Teacher knowledge (subject, pedagogy and pedagogical content knowledge); Teacher professionalism and reflectivity; Promoting active learning and developing metacognitive skills	International
Meta-analysis results of teaching effectiveness (Seidel & Shavelson, 2007)	Domain of learning; Time for learning; Organisation of learning; Social context; Orientation; Execution of learning; Evaluation; Regulation and monitoring	International
Teaching factors of the dynamic model of educational effectiveness	Orientation; Structuring; Questioning;	The Netherlands

(Creemers & Kyriakides, 2008)	Teaching-modelling; Applications; Management of time; The teacher role in making classroom a learning environment; Classroom assessment	
Instructional quality (Klieme et al., 2009)	Cognitive action; Classroom management; Supportive climate	Germany
State of the art - teacher effectiveness (Muijs et al., 2014)	Opportunity to learn and time on task; Instruction and interaction; Classroom climate; Teacher expectations; Differential teacher effectiveness	International

For example, the teacher effectiveness model identified by DfEE (2000) in England includes dimensions of professional characteristics, teaching skills and classroom climate associated with student progress. Campbell and colleagues define teacher effectiveness more broadly, based on a differential teacher effectiveness model, as "the power to realise socially valued objectives agreed for teachers' work, especially, but not exclusively, the work concerned with enabling pupils to learn" (Campbell et al., 2003, p. 354). This differential teacher effectiveness model focuses on differences in activity, subjects, student background factors, student personal characteristics, and cultural and organisational context (Campbell et al., 2003). Some of the models tend to define teacher effectiveness in an even broader sense referring to inputs, processes and context as well as student outcomes or progress, such as the UNESCO model comprising dimensions of teacher characteristics, student characteristics, curriculum, classroom, teaching and learning (Anderson, 2004). Some others centre on teaching effectiveness or effective teaching (Seidel & Shavelson, 2007; Teddlie et al., 2006), such as the meta-analysis of Seidel and Shavelson (2007) on teaching effectiveness regarding components of domain of learning, time for learning, organisation of learning, social context, goal setting, execution of learning, evaluation and regulation and monitoring. Some of them focus on teaching process factors and student learning at different levels, such as the teaching factors within the dynamic model of educational effectiveness regarding orientation, structuring, questioning, teaching-modelling, applications, management of time, the teacher role in making classroom a learning environment, and classroom assessment (Creemers & Kyriakides, 2008). Others centre on instructional quality that can be measured by dimensions of cognitive action, classroom management and supportive climate (Klieme et al., 2009). More recently, factors of opportunity to learn and time on task, instruction and interaction,

classroom climate, teacher expectations and differential teacher effectiveness are discussed in a state of the art review on teacher effectiveness (Muijs et al., 2014).

However, given that teaching practices are diverse and context-specific, there is not yet a "golden standard" to model these in relation to better student outcomes or progress (Ko & Sammons, 2013). There is a need to extend the scope of teacher effectiveness from a traditional focus on teaching practices and teacher behaviours measured by students' cognitive learning outcomes to an emphasis on both cognitive and meta-cognitive learning outcomes. Particularly, there is a need to address the significance of "teacher reflectivity" as one significant dimension of teacher effectiveness, since it has been measured as one important process factor in the International System for Teacher Observation and Feedback (ISTOF) constructs (Teddlie et al., 2006). Other ISTOF factors are associated with assessment and evaluation, clarity of instruction, classroom climate, classroom management, differentiation and inclusion, instructional skills, planning of single lessons, long-term planning, teacher knowledge (subject, pedagogy and pedagogical content knowledge), teacher professionalism and promoting active learning and developing metacognitive skills (Teddlie et al., 2006).

3.3.3 Key Findings of Educational Quality and Effectiveness That Are Relevant to Teacher Professional Development

In addition to the teacher process factors mentioned in above teaching models, the results of PISA 2000 have shown that student characteristics (50%), school context (18%) and school climate, policies and resources (6%) can explain three quarters of the differences in school performance (OECD, 2005a). The analyses of these results were carried out with the value-added model (the model with student background variables, but without school average socio-economic status and policy-amenable school variables) as a baseline (OECD, 2005a). Also, the first TALIS results have indicated that fewer student-oriented practices are used in larger classes across countries, which suggests that larger class sizes may limit the possibility for teachers to be responsive to the needs of individual students (OECD, 2009). School location, size and the characteristics of student population are important aspects of teachers' work environment and can interact with other aspects of teachers' work (OECD, 2014b).

Resource-only policies are less likely to be effective, and resources policies should be linked to incentives, particularly targeting socioeconomically disadvantaged students (OECD, 2014b).

Moreover, evidence from the PISA 2000 has indicated that the school factors which are most important in educational effectiveness research are those that are closer to students' actual learning process and likely to have the strongest impact (OECD, 2005a). Some research highlights that the variables at the level of classroom teaching have the strongest impact (Scheerens, 2005). Other evidence has shown that the effects of student, classroom and school variables on student achievement (in Mathematics) are multilevel and the net effect of classrooms is higher than that of schools (Kyriakides, Campbell, & Gagatsis, 2000). Teacher behaviours are able to explain between 60% and 100% of student progress on the Numeracy tests, after controlling for other factors (Muijs & Reynolds, 2000). Teacher behaviours have a greater impact on both unadjusted achievement and student progress than on the classroom organisation variables (e.g. setting, class size and in-class differentiation) (Muijs & Reynolds, 2003). Overall, these findings have shown that there is a need to focus on teachers' classroom teaching and particularly teacher behaviours.

In terms of the effects of teaching approaches on student outcomes, review findings of meta-analysis have indicated that the effects of teaching on student outcomes are diverse and complex but systematic (Seidel & Shavelson, 2007). For instance, domain-specific components are identified to be the most effective teaching factor. The execution of domain-specific learning activities has the strongest impact on cognitive outcomes. Domain-specific activities, social experiences, time for learning and regulation and monitoring have the highest effect sizes for motivational-affective outcomes. Domain-specific learning activities, time for learning and social experiences show the highest effect sizes for learning processes (Seidel & Shavelson, 2007). In addition, the link between TALIS 2013 with PISA 2012 student data has indicated that the interactions between teacher characteristics and student measures and achievement are complex, intertwined and often unique to individual countries (Austin et al., 2015). It is found that "measures of variability add a comparable amount of explanatory power compared to averaged index scales", and "the use of country specific models, particularly models that incorporate measures of variability in addition to standard

index scales, need to be further explored" (Austin et al., 2015, p. 65). It is very difficult to fit a single explanatory model to describe all possible relationships, which reflects the complexity of investigating educational quality and effectiveness. Many of the multilevel models revealed significant interactions involving student measures with teacher gender, subject taught, and years of experience (Austin et al., 2015). Most of the total variance in teachers' reported teaching practices is explained by the differences between individual teachers. Variance attributable to school-level and country-level differences is minimal. Therefore, efforts to change teaching practices are more likely to have an impact if directed towards individual teachers (OECD, 2014b). Overall, these findings have indicated a need for investigating individual teacher behaviours to improve the impact of teaching practices on student achievement, and this need could be addressed by promoting and supporting teacher professional development.

3.4 Current State of Teacher Professional Development Internationally: High Quality Teacher Professional Development, Its Impact on Student Achievement, and Supporting Conditions

Teacher professional development is defined by UNESCO as "a long-term process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession" (Villegas-Reimers, 2003, p. 12). It is essentially concerned with how to develop teachers' knowledge, skills and character dispositions. This argument can be evidenced by a series of UNESCO EFA Global Monitoring Reports regarding the "Quality Imperative" (UNESCO, 2004), "Teaching and Learning: Achieving Quality for All" (UNESCO, 2014), and "Education for People and Planet: Creating Sustainable Futures for All" (UNESCO, 2016). It can be also evidenced by the OECD TALIS report "Supporting Teacher Professionalism: Insights from TALIS 2013" (OECD, 2016b), and the background reports of the International Summit on the Teaching Profession such as "Teaching Excellence through Professional Learning and Policy Reform: Lessons from around the World" (Schleicher, 2016), "Building a High-Quality Teaching Profession: Lessons from around the World" (OECD, 2011) and "Teachers Matter: Attracting, Developing and Retaining Effective Teachers" (OECD, 2005b). One key argument that has arisen from the above reports is that there is a pressing need to prepare teachers for improving their professional knowledge, skills and dispositions for the 21st century, particularly in terms of teacher motivation, commitment and capacity,

school-level support and effective teacher learning activities (Darling-Hammond, Hyler, & Gardner, 2017; Kennedy, 2016).

More importantly, supporting teacher professional development and learning has been perceived as a key international priority highlighted in the report of the 2017 International Summit on the Teaching Profession, together with other priorities of "empowering and enabling teachers to improve equity and outcomes for all", "ensuring appropriate national education structures and policy environment, and "striving for sustainable quality and equity in learning" (Gomendio, 2017). It is therefore crucial for teachers to develop themselves professionally for their professional growth, and, as will be argued later, this is one justification for focusing this study on a particular approach to promoting teacher professional development, collaborative reflective enquiry. Overall, this section critically reviews international research evidence relating to the characteristics of high quality teacher professional development, its impact on teaching practices and student achievement, and the supporting conditions for teacher professional development.

3.4.1 What Are the Characteristics of High Quality Teacher Professional Development?

The characteristics of high quality teacher professional development in the international literature are typically used to deliver and evaluate professional development programmes, as mentioned in Chapter 1 Introduction. Therefore, these characteristics are relatively generalisable across contexts and have been identified across different literature reviews. For example, factors in relation to content focus, active learning, coherence, the form of the activity, collective participation/collaboration and duration have been examined to be key features of high quality teacher professional development (Darling-Hammond et al., 2017; Desimone, 2009; Garet, Porter, Desimone, Birman, & Yoon, 2001). These features are associated with effective teaching practices and student outcomes in different reviews of empirical studies.

Table 4. Characteristics of High Quality Teacher Professional Development

Characteristics	**References**
Content focus	(Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Garet et al., 2001; Kennedy, 2016; NSW Department of Education and Communities, 2014; OECD, 2016b)

Active learning	(Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Garet et al., 2001; OECD, 2016b)
Coherence	(Desimone, 2009; Garet et al., 2001)
The form of the activity	(Darling-Hammond et al., 2017; Garet et al., 2001; Kennedy, 2016; OECD, 2016b)
Collective participation/collaboration	(Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Garet et al., 2001; Kennedy, 2016; OECD, 2016b; Opfer, 2016; Reid & Kleinhenz, 2015; Stoll et al., 2012)
Duration	(Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Garet et al., 2001; OECD, 2016b)

Specifically, the findings of a review on improving impact studies of professional development have indicated that content focus, active learning, coherence, duration and collective participation can increase teachers' knowledge and skills, affect teachers' attitudes and beliefs, and improve their instruction and student learning outcomes (Desimone, 2009). Similarly, it is found in another review that has examined how teacher professional development improves teaching that factors regarding content knowledge, collective participation, programme intensity and use of coaches have a positive impact on teachers' teaching (Kennedy, 2016). In line with the findings of the above two reviews, another recent review by Darling-Hammond et al. (2017) has indicated seven similar features of effective teacher professional development regarding content focus, active learning, collaboration, use of models and modelling, coaching and expert support, feedback and reflection, and sustained duration. These seven features are summarised based on the findings of 35 methodologically rigorous studies that have demonstrated a positive link between teacher professional development, teaching practices and student outcomes.

More broadly, it is found in the OECD document "Teaching Excellence through Professional Learning and Policy Reform: Lessons From Around the World" that the most effective forms of professional development are those that "focus on clearly articulated priorities", "provide on-going school-based support to classroom teachers", "deal with subject-matter content as well as instruction strategies and classroom-management techniques" and "create opportunities for teachers to observe, experience and try new teaching methods" (Schleicher, 2016, p. 44). These features have reflected the high quality characteristics of teacher professional development relating to content focus, collaboration and the form of the activity (school-based). Particularly, the results of the analysis on TALIS 2013 data across 35 educational systems have shown that teachers who participate in curriculum-focused teacher

professional development activities are more likely to report using a variety of different instructional methods (Barrera-Pedemonte, 2016).

Similarly, in the literature review by the NCSL in the UK, nine key claims have been outlined on the basis of previous research regarding teacher professional development (Stoll et al., 2012). The findings have indicated that high quality professional development "starts with the end in mind", "challenges thinking as part of changing practice, "is based on the assessment of individual and school needs", "involves connecting work-based learning and external expertise", "*uses action research and enquiry as key tools*, "is strongly enhanced through collaborative learning and joint practice development", "is enhanced by creating professional learning communities within and between schools", and "requires leadership to create the necessary conditions" as well as that "effective professional learning opportunities are varied, rich and sustainable" (Stoll et al., 2012, p. 3). These characteristics have highlighted the aspects of collaboration, reflection, enquiry, assessment, PLCs, leadership that are related to the focus of this study on collaborative reflective enquiry. Likewise, the Standard for Teachers' Professional Development in the UK has outlined similar key professional development features (DfE, 2016). Teacher professional development "should have a clear focus on improving and evaluating pupil outcomes", "should be underpinned by robust evidence and expertise", "should include collaboration and expert challenge", "should be sustained over time", and "must be prioritised by school leadership" (DfE, 2016, p. 2). Again, the aspects of collaboration, evidence use, content focus, duration, school leadership and evaluation are highlighted. Besides, factors such as evidence use, collaboration, mentoring and coaching, evaluation and school leadership are also included in other government documents such as "The Logical Chain: Continuing Professional Development in Effective Schools" (Ofsted, 2006). It is mentioned in this document that teacher professional development could be promoted via "enhancing managers' skills in evaluating the impact of their CPD arrangements", "devising easy-to-use practical tools to enable schools to increase cost effectiveness of their CPD", "encouraging more subject-specific training and development", "disseminating effective methods for identifying staff's individual needs and provide models of individual training plans for schools to adopt or adapt", and "making more effective use of coaching and mentoring" (Ofsted, 2006, p. 5). These approaches could potentially be facilitated by PLCs.

In addition, the findings of the review conducted by the Centre for Education Statistics and Evaluation in New South Wales, Australian Government have shown that high quality professional development needs to be promoted by focusing on teachers' content knowledge, school-level support and student learning outcomes (NSW Department of Education and Communities, 2014). It is noticed that these aspects align with the high quality characteristics of teacher professional development mentioned in previous sections. More importantly, the finding of another review conducted by the Office of Development Effectiveness, Australian Government regarding supporting teacher professional development has indicated that "the most effective professional learning takes place at school level as teachers collaboratively engage in planning, assessing and evaluating student progress, innovation and reflection (Reid & Kleinhenz, 2015, p. 7). The role of school-based training and support have been emphasised, together with school leadership in facilitating teacher professional development and learning. Overall, these key findings have suggested the importance of collaboration, reflection and enquiry as well as PLCs in promoting teacher professional development and learning.

3.4.2 What Is the Impact of Teacher Professional Development on Student Achievement?

The impact of teacher professional development on student achievement essentially builds on existing evidence that teacher professional development can improve teaching practices, and teaching practices can positively affect student achievement/progress. Hence, the assumption is that teacher professional development can positively affect student achievement directly. Although the evidence is not as strong as the impact of teaching practices on student achievement/progress, some evidence in the international literature has indicated that there is a positive link between teacher professional development, teaching practices and student outcomes/progress (Darling-Hammond et al., 2017; Desimone, 2009). Teacher professional development can positively affect student achievement (Akiba & Liang, 2016; Blank & Alas, 2009; Carrillo, Maassen van den Brink, & Groot, 2016; Timperley et al., 2007; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). For instance, opportunities for teachers to engage in professional learning and development can have a substantial impact on student learning (Timperley et al., 2007). This finding is based on the analysis of 57 studies that have

demonstrated links between teachers' professional development and learning, changes in teachers' classroom practice and student learning outcomes (e.g. academic, personal and social outcomes). Similarly, the findings of a review of more than 1,300 studies have indicated a moderate effect of teacher professional development on student achievement, particularly based on the nine studies meeting What Works Clearinghouse evidence standards (Yoon et al., 2007). The nine studies have been selected to address the paucity of rigorous studies that directly assess the effect of teacher professional development on student achievement in Mathematics, Science and Reading and English Language. The results of this review have shown that teachers who have participated in substantial professional development (e.g. 49 hours in the nine studies) can enhance their students' achievement by about 21 percentile points. Likewise, the meta-analysis of 16 studies regarding the effects of teacher professional development has identified a modest effect of teacher professional development on student achievement (Blank & Alas, 2009). The findings of this meta-analysis have indicated a relatively consistent positive effect of teacher professional development (e.g. coaching, mentoring, professional networks, and study group) on student achievement in Mathematics.

More recent empirical studies and reviews have examined specifically the effect of teacher professional development on achievement in different subject areas, school type and professional development activities. For example, the results of one systematic review of 21 selected papers in subject, school level and type of professional development programmes have indicated a positive effect of teacher professional development on student achievement (Carrillo et al., 2016). The findings of this review have suggested that there is more evidence about the positive effect of professional development on Mathematics than Reading, in elementary schools than secondary schools, based on content-based programmes than pedagogical ones. Similarly, the findings of a longitudinal survey that examined the effects of six types of teacher professional learning activities on student achievement growth over 4 years in the US have indicated that professional development activities relating to teacher-centred collaboration (teacher collaboration and informal communication) and teacher-driven research can positively affect student achievement in mathematics (Akiba & Liang, 2016). This finding is highly relevant to the focus of the present study on teachers' collaborative research into teaching, which supports the overarching rationale mentioned in Chapter 1 Introduction.

3.4.3 What Are the Supporting Conditions for High Quality Teacher Professional Development?

Compared to the characteristics of high quality teacher professional development and its impact on student achievement, it seems that the supporting conditions for high quality teacher professional development may vary, depending on the context of the professional development. For example, the UNESCO literature review of teacher professional development has highlighted some broad factors that need to be considered when planning, implementing and assessing professional development (Villegas-Reimers, 2003). The factors are associated with a culture of support, the role of context, stages of development of a school system, time, financial resources, stages in professional development, steps of professional development, the use of technology for teaching purposes, the role of Unions in teacher professional development and the role of teacher-educators (Villegas-Reimers, 2003). Crucially, socio-cultural factors, context, time and financial resources may vary across countries and hence are likely to shape teachers' professional development practices.

Other findings have directed attention to the possibilities of creating conditions for facilitating teacher learning at both the school and system levels (Darling-Hammond et al., 2017). For instance, the factors that could be considered at the school level for supporting environments are related to sufficient time allocated to curriculum, resources that are available for curriculum materials, technology and science equipment, and classroom management skills, as well as teaching mandated curriculum on a pacing guide and addressing student learning (Darling-Hammond et al., 2017). It is important to provide teachers with sufficient resources to ensure the implementation of teacher professional development programmes. At the system level, teacher professional development could potentially be promoted through identifying professional development needs, choosing approaches most likely to be effective, implementing approaches with quality and fidelity and assessing professional development outcomes (Darling-Hammond et al., 2017). It is noticed that the idea of PLCs that incorporate many of the above aspects is relevant to these conditions and has been shown to support teacher professional development, which will be discussed in next section.

In addition, attempts have been made on the basis of the TALIS data to identify broad strategies for teacher professional development across education systems (Schleicher, 2016). These strategies can provide some general but useful insights into considering ways of improving teacher professional development in a more specific context. For example, the strategy can be entitlement-based and focus on providing teachers with certain amounts of time and financial support for them to undertake professional development activities. The strategy can also be incentive-based, which is linked to teachers' pay rise and job promotion for higher level and stronger intensity of teachers' participation in professional development activities. The strategy can be alternatively school-based, which links to individual teachers' development. It is argued that the entitlement-based and incentive-based approaches to teacher professional development could impact on teachers' motivation and commitment, whereas the school-based strategy could enhance teachers' professional capacity in their teaching (Schleicher, 2016). Crucially, these strategies are also highly relevant to the Chinese context.

3.5 Current State of PLCs Internationally: The Significance of Collaboration and Enquiry

Reflecting and combining many of the positive conditions identified to support teachers' professional development reported in the section above, international research evidence on the concept of PLCs has flourished rapidly over the past a few decades. Such evidence has arisen from different continents such as North America (Hord, 1997; Louis, Marks, & Kruse, 1996), Europe (Bolam et al., 2005; Lomos, 2017) and more recently in the Asia-pacific region (L. Chen, 2020; D. Lee, Ying, & Hong, 2015; Pang & Wang, 2016; Qiao et al., 2018; Thomas et al., 2017). It seems that the understanding of the PLCs concept has been transitioning from country perspectives to international commonalities (J. B. Huffman et al., 2016; OECD, 2016b). One key argument that has been reflected in the research evidence across continents and countries is that *the PLCs concept is intrinsically about communities of continuous enquiry and improvement* (Hord, 1997). This argument lies at the heart of this study on collaborative reflective enquiry. One illustrative example of PLCs is the EPLC framework that comprises eight PLCs dimensions of "collaboration focused on learning, reflective professional enquiry, shared values and vision, collective responsibility for pupils' learning, group as well as

individual professional learning, openness, networks and partnerships, inclusive membership, and mutual trust, respect and support" (Bolam et al., 2005, p. i).

Overall, the PLCs concept is usefully employed in this study as an umbrella term for conceptualising the main phenomena of interest in this study, teachers' collaborative reflective enquiry. The PLCs concept is perceived as a significant organisational structure that facilitates teachers' collaboration, reflection and enquiry for improving student learning (Bolam et al., 2005; Hord, 1997; Katz & Earl, 2010; OECD, 2016b). Hence, this section follows the key aspects reviewed for teacher professional development in previous sections and focuses on the definition, features and impact of PLCs.

3.5.1 What Is the Definition of PLCs?

Definitions regarding the concept of PLCs are similar across different PLCs models in the international literature. For example, the concept of PLCs can be defined as:

> "…teachers in a school and its administrators continuously seek and share learning, and act on their learning. The goal of their actions is to enhance their effectiveness as professionals for the students' benefit; thus, this arrangement may also be termed communities of continuous inquiry and improvement…" (Hord, 1997, p. 6)

PLCs practices need to be supported by a culture of collaboration and teacher commitment, focus on results, and ensure that students learn (DuFour, 2004). Similarly, based on the findings of the EPLC project in the UK, the concept of PLCs can be defined as:

> "An effective professional learning community has the capacity to promote and sustain the learning of all professionals in the school community with the collective purpose of enhancing pupil learning." (Bolam et al., 2005, p. 145).

The concept of PLCs can foster collaborative learning amongst teachers within a collegial environment and provide teachers with opportunities for exchanging effective practices, questioning ineffective teaching and examining new concepts of teaching and learning (Katz & Earl, 2010).

3.5.2 What Are the Features of PLCs?

In terms of the PLCs features, it is found that most of the PLCs models are characterised by more or less similar features. For example, building upon the PLCs framework of Louis et al. (1996), the PLCs model of the 2013 OECD TALIS comprises dimensions of "collaborative activity, reflective dialogue, deprivatised practice, shared sense of purpose, and collective focus on student learning" (OECD, 2016b). This PLCs model has underpinned a variety of empirical PLCs studies in the literature, such as the PLCs study of Lomos (2017) which analysed data from more than 35,000 secondary school teachers across 23 European countries. Moreover, another PLCs model in the US context consists of factors relating to "collective creativity, supportive conditions, supportive and shared leadership, shared values and vision, and shared personal practice" (Hord, 1997).

Building on the above and other relevant models, the PLCs model proposed by Bolam and colleagues in the UK context consists of eight dimensions regarding "collaboration focused on learning, reflective professional enquiry, shared values and vision, collective responsibility for pupils' learning, group as well as individual professional learning, openness, networks and partnerships, inclusive membership, and mutual trust, respect and support" (Bolam et al., 2005, p. i). Similarly, the model of networked learning communities in the UK includes factors of "relationships and collaboration, enquiry, capacity for collaborative reflective enquiry in schools, focus, formal and distributed leadership" (Katz & Earl, 2010). Overall, it is noticed that the characteristics of collaboration, reflection and enquiry can be found across most of the PLCs models.

Table 5. Features of PLCs

Features	**References**
Collaboration	(Bolam et al., 2005; Hord, 1997; Katz & Earl, 2010; Louis et al., 1996; OECD, 2016b)
Reflection	(Bolam et al., 2005; Louis et al., 1996; OECD, 2016b)
Enquiry	(Bolam et al., 2005; Katz & Earl, 2010)
Shared values and vision	(Bolam et al., 2005; Hord, 1997; Louis et al., 1996; OECD, 2016b)
Collective responsibility for pupils' learning	(Bolam et al., 2005; Louis et al., 1996; OECD, 2016b)
Group as well as individual professional learning	(Bolam et al., 2005; Louis et al., 1996; OECD, 2016b)
Openness, networks and partnerships	(Bolam et al., 2005; Katz & Earl, 2010)
Inclusive membership	(Bolam et al., 2005)
Mutual trust, respect and support	(Bolam et al., 2005; Hord, 1997)

Leadership	(Hord, 1997; Katz & Earl, 2010)

Crucially, the results of TALIS 2013 have shown that there are more PLCs practices associated with teacher collaboration and reflective dialogue in schools in which principals show greater instructional leadership (OECD, 2016b). This is closely linked to the focus and rationale of the present study. Also, it seems that PLCs characteristics are unevenly represented across different education systems (OECD, 2016b). For example, it is reported that teachers in Spain, Australia, Sweden, New Zealand and Norway are most engaged in collaborative practices, in comparison to Korea, Mexico, Brazil, Chile and Croatia. In terms of reflective dialogue, teachers in Malaysia, Chile, Romania, Mexico and Abu Dhabi (UAE) perceive more challenges in their knowledge and skills based on the feedback they receive (OECD, 2016b).

In the Asia Pacific region, some emerging empirical evidence of different PLCs practices has been identified (e.g. the Special Issue of the Asia Pacific Journal of Education[5]) (Pang & Wang, 2016). For example, the findings of a small-scale survey investigating PLCs in Shanghai and Southwest China have suggested five PLCs characteristics of "collaborative learning, professional competency, facilitative leadership, structural support and organisational barriers" (J. Zhang & Pang, 2016). Similarly, it is found in a PLCs case study of two senior secondary schools in Northeast China that "Teaching and Research Groups, Lesson Preparation Groups and Grade Groups" are identified to be specific PLCs practices in the Chinese context, and that school leadership plays a significant role in developing and sustaining PLCs process for school improvement (T. Wang, 2016). Other evidence based on four case study schools in mainland China has indicated that the most developed PLC features comprise shared values and vision, collective responsibility for student learning, collaboration focused on learning, and group as well as individual professional learning (Thomas et al., 2017). The evidence is more mixed for the two PLCs features of mutual trust, respect and support, and openness, networks and partnerships. The most challenging PLCs features are reflective professional enquiry and inclusive membership (Thomas et al., 2017). In the context of Hong Kong-China, six similar factors are identified in a small-scale survey regarding

[5] For details about the special issue of "Global Perspectives on Developing Professional Learning Communities", please visit: https://www.tandfonline.com/toc/cape20/36/2?nav=tocList

"leadership for teacher learning, collaborative learning capacity, student-focused orientation, a culture of sharing, mutual understanding and support, and continuous professional development" (Pang, Wang, & Leung, 2016). In Taiwan, the findings of a relatively large-scale survey (using confirmatory factor analysis and structural equitation modelling) have indicated four PLCs dimensions regarding "supportive and shared leadership, shared visions, collegial trust, and shared practices" (P. Chen, Lee, Lin, & Zhang, 2016). Of these four PLCs dimensions, a collegial trust relationship is found to be strongly related to shared practices as an important mediating factor between supportive and shared leadership, shared visions, and shared practices. In Singapore, three dimensions are explored through an ethnographic case study approach to participant observations of teacher groups called "Professional Learning Teams" regarding "ensuring students learn, building a culture of collaboration and focusing on student learning outcomes" (Salleh, 2016). The concept of PLCs in the Singaporean context has been used for promoting teacher-led professionalism (D. Lee et al., 2015). In South Korea, the findings of secondary data analysis (TALIS 2008 data) based on descriptive statistics and ANOVA have suggested three PLCs components regarding "shared visions, values, norms, and responsibilities, focus on student learning with academic support, and professional learning from various collaborative activities" (M. Lee & Kim, 2016). This approach to data analysis is similar to that of the survey research in the present study.

In addition, the processes of "optimising resources and structures to promote PLCs, promoting professional learning, evaluating and sustaining PLCs, and leading and managing to promote PLCs" (Stoll et al., 2006) can be used for the establishment and development of PLCs. These dynamic processes based on research evidence in the UK are slightly different from other PLCs models that focus more on characteristics or features. Nevertheless, it has been argued that the extent to which the school is structured and resources are used has a profound impact on the establishment of PLCs (Bolam et al., 2005; Stoll et al., 2006). Time and money are identified as main facilitators for developing PLCs, which are also considered important in facilitating supporting conditions for teacher professional development and learning as mentioned before (Schleicher, 2016; Villegas-Reimers, 2003). Besides, it has also been argued that finding different ways of promoting and organising professional learning opportunities is vitally important, and the professional learning opportunities need to be informed by school development priorities and to be planned strategically.

3.5.3 What Is the Impact of PLCs on Student Achievement?

In terms of the impact of PLCs on student achievement, some evidence has shown that PLCs can positively affect student achievement (Akiba & Liang, 2016; Doğan & Adams, 2018; Lomos, Hofman, & Bosker, 2011; Prenger, Poortman, & Handelzalts, 2019; Vescio, Ross, & Adams, 2008). For example, a positive impact of PLCs on teaching practices and student achievement has been found in a review of 10 American studies and one English study (Vescio et al., 2008). Also, evidence from a meta-analysis has indicated a significant effect ($d = .25$, $p < .05$) of PLCs on student achievement (Lomos et al., 2011). Similarly, the findings of a large-scale survey in the US context have shown that teacher-centred collaborative activities such as teacher collaboration and informal communication seem to be effective in improving student mathematics achievement than learning activities that do not necessarily involve such teacher-centred collaborative opportunities (Akiba & Liang, 2016). The data of this survey was collected from 467 middle school mathematics teachers in 91 schools merged with 11,192 middle school students. More recently, the findings of a review of 13 empirical international studies have confirmed the positive impact of PLCs on student achievement (Doğan & Adams, 2018). The studies included in this review have reported improved student achievement mostly in reading, language and mathematics. The terms used in the review for measuring student achievement are related to improved student achievement, non-academic student gains, and reported explanations of improvements in student outcomes (Doğan & Adams, 2018). Relevant to student achievement, the results of another small-scale mixed methods study that examined the effects of 23 networked professional learning communities in the Dutch context have shown moderately positive effects on teachers' perceived satisfaction, knowledge, skills and attitude (Prenger et al., 2019).

3.6 Collaborative Reflective Enquiry: Why Are the Three Elements of Collaboration, Use of Research and Evidence, and Reflection a Specific Focus for This Study?

The particular importance of collaboration, enquiry relating to use of research and evidence, and reflection is reflected in the empirical evidence of teacher professional development and PLCs mentioned in previous sections. The three elements of collaboration, use of research

and evidence, and reflection play an important role in promoting teacher professional development. These overlapping elements can be conceptualised within a framework of collaborative reflective enquiry as follows:

Figure 3. Three Elements of Collaborative Reflective Enquiry

For instance, collaboration has been identified as a key feature of high quality teacher professional development across different research reviews (Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Kennedy, 2016; Opfer, 2016; Reid & Kleinhenz, 2015; Stoll et al., 2012). Use of research and evidence has been perceived to be a significant element of teacher professional enquiry, reflecting the "research-based" nature of teaching as a profession (DeLuca et al., 2017; D. H. Hargreaves, 1996; Harris & Jones, 2012; T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). Reflection has been considered crucial in contributing to teacher professional learning and the transformation of teachers to become reflective practitioners (Brookfield, 1995; Chetcuti, Buhagiar, & Cardona, 2011; Fazio, 2009; Fook, Psoinos, & Sartori, 2016; Smyth, 1989). Overall, the concept of collaborative reflective enquiry comprising collaboration, use of research and evidence, and reflection could potentially encourage teachers to improve their understanding of what teaching and learning is, generate evidence of what works, and make decisions about what actions could be taken for educational improvements (The Ontario Ministry of Education, 2010).

3.6.1 Why Collaboration?

> "Over the past 25 years, following the findings that collaboration can increase student achievement and reduce teacher conservatism towards change, many specific designs have emerged to initiate or increase collaborative activity in schools. These include but

> are not restricted to professional learning communities, collaborative planning, learning walks, instructional rounds, collaborative inquiry, lesson study, school networks, data teams, self-evaluation processes, and peer review" (A. Hargreaves, 2019, p. 16)

This strand of international literature on teacher professional development has centred on the significance of collaboration or collective participation in promoting high quality professional development (Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; A. Hargreaves, 2019; Kennedy, 2016; OECD, 2016b; Opfer, 2016). For example, evidence has shown that factors of collective learning activities or research with other teachers, opportunities for active learning methods, an extended time period, a group of colleagues are associated with high quality teacher professional development (OECD, 2016b). Evidence from the TALIS 2013 regarding high-quality teacher professional development and classroom teaching practices has indicated that teacher professional development delivered with greater levels of teacher collaboration, active learning and longer duration increases the likelihood of teachers' use of different teaching strategies (Barrera-Pedemonte, 2016). Similarly, factors of "teacher co-operation" and "instructionally focused leadership" in schools have been identified to significantly impact on professional development participation and reported instructional impact (Opfer, 2016).

3.6.2 Why Use of Research and Evidence?

> "…This is about empowering teachers, school and college leaders, and all who work with them, to better understand how they might enhance their practice and increase their impact in the classroom and beyond. In short, it is about developing the capacity of teachers, schools and colleges, and education systems as a whole to self-evaluate and self-improve, through an ongoing process of professional reflection and enquiry" (Furlong et al., 2014, p. 6).

This strand of research on teacher professional development synthesises literature in relation to both "research-based teacher education" and "evidenced-based education policy and practice". It focuses primarily on enquiry as a useful approach to enhancing teachers' professional development and learning. In terms of the literature on research-based teacher education, some evidence has indicated that a research literate and research-engaged profession is likely to have a positive impact on student learning outcomes (Furlong et al.,

2014). This finding has arisen from the report of a systematic enquiry into the role of research in teacher education, which is published by the British Educational Research Association (BERA). It is found that research rich school environments are regarded to be the hallmark of high performing systems internationally. Research engagement could potentially contribute to developing a research rich school culture and enhancing school and systemic capacity for improvement (Furlong et al., 2014). Similarly, the report entitled "Professional Practitioner Use of Research Review: Practitioner Engagement in and/or with Research" has highlighted a key finding that research engagement can help practitioners contextualise research findings in their own contexts (Bell, Cordingley, Isham, & Davis, 2010). Research engagement can provide teachers with a rationale for investigating their practice through a wide range of lenses, impacting on student learning. In the NCSL report entitled "Great Professional Development Which Leads to Great Pedagogy: Nine Claims from Research", the role of research engagement is emphasised in terms of helping develop a sustained and growing capacity at the school level and beyond as follows:

> "Commitment to research engagement is an important feature of professional learning because it fosters a proper regard for evidence which can be used to change practice and improve pupil outcomes. It also establishes research communities within and beyond the school that sustain professional learning over time" (Stoll et al., 2012, p. 6).

However, more empirical evidence is needed to support the above argument, particularly in terms of examining the relationship between research use and teaching practices, and more importantly the impact of research use on student achievement. For example, despite a positive link between research engagement and teacher factors, no evidence regarding the impact of research engagement in improving student learning outcomes is found in the Education Endowment Foundation (EEF) commissioned evaluation project of research learning communities in the UK (Rose et al., 2017). A randomised controlled trial has been used in this project to measure the impact of the intervention regarding teacher research engagement on reading outcomes for Year 6 students.

Nevertheless, the importance of use of research and evidence has been highlighted in its potential in promoting teachers' professional development and learning (e.g. the 2015 Special

Issue of the journal Oxford Review of Education[6]). For instance, Cordingley (2015) has summarised findings of several systematic reviews on the contribution of research to teachers' professional development and learning, suggesting the importance of conceptualising researchers' contributions to teachers' professional development and learning as specialist expertise. Winch, Oancea, and Orchard (2015) have argued, from a philosophical point of view, that education research can both enrich and be enriched by teachers' professional knowledge and practice through exploring the contribution of educational research to teacher professional development and learning. Leat, Reid, and Lofthouse (2015) have addressed the importance of dialogical approaches and ecological agency and their links to teachers' perceptions of and participation in research in a review of teachers' experiences on engagement with and in educational research. Five themes of "purpose and consequence, teachers' learning and affective response, agency, trust and collaboration, and contradiction" are highlighted in this review. More broadly, Tatto (2015) has discussed the role of research in the policy and practice of quality teacher education in an international review by investigating the quality assurance processes of teacher education in four countries (Finland, Singapore, USA & Chile). This review highlights a key question as to how to embed research that is evidenced by successful practice in the programme design of teacher education for further improvements. Similarly, Mincu (2015) has discussed the importance of research in teacher quality and school improvement, arguing that research-based knowledge is key to effective learning processes and whole school improvement.

Very importantly, other evidence has indicated that promoting teachers' professional development and learning through research engagement needs to be facilitated by school leadership practice (Brown & Zhang, 2017; Cornelissen, McLellan, & Schofield, 2017; Scott & McNeish, 2013). For example, the results of a relatively large-scale survey in the UK have shown that the ways of establishing evidence-informed schools could be supported by potential school policy levers that are associated with "teacher capacity to engage in and with research and data", "school cultures that promote the use of research and support evidence use", and "the enabling structures and resources that facilitate research-use" (Brown & Zhang, 2017). Moreover, the findings of a multi-method longitudinal case study that explored

[6] For details about this special issue, please visit: https://www.tandfonline.com/toc/core20/41/2?nav=tocList

research-engaged relationships and values in the UK have indicated that research engaged practice could be promoted through an approach to school leadership that combines the development of both formal structures and informal networking (Cornelissen et al., 2017). These findings are similar to those of PLCs. In addition, evidence of a review by the National Centre for Social Research for CUBeC in the UK regarding school leadership has indicated useful leadership strategies for the use of research evidence to support school improvement. These strategies are related to creating a learning culture that integrates the use of research into staff development, supporting staff involvement with and in research, and cultivating and making use of external support (Scott & McNeish, 2013).

Adding to the above strand of literature regarding research-based teacher education, the literature on evidence-based educational policy and practice has been discussed in a relatively broader sense. The narratives in this regard have been focusing primarily on the debate around what works best. For example, it has been argued that a focus on rigorous experiments evaluating replicable programmes and practices can be essential to build confidence in education research amongst policymakers and educators (Slavin, 2002). A need has been advocated for building evidence that is scientifically valid and readily interpretable into education policy and practice (Slavin, 2008). Meanwhile, issues of what works for knowledge production and transformation, and knowledge engagement and use have been addressed in a report entitled “Using Evidence in the Classroom: What Works and Why?” by the National Foundation for Educational Research (NFER) in the UK. The importance of teacher-led research and enquiry has been highlighted, indicating the need for a national infrastructure of knowledge mobilisation in the UK (J. Nelson & O'Beirne, 2014). Also, it has been argued that there is a need to empower teachers to engage with different sources of evidence to make evidence-based decisions on their selection of teaching approaches so as to develop teachers’ capacity in forming critical judgements about teacher and student learning (Nelson & O’Beirne, 2014). Similarly, the importance of creating a demand for evidence, an effective supply of evidence, and a supporting infrastructure has been emphasised in another NFER report entitled “Why effective use of evidence in the classroom needs system-wide change” (Durbin & Nelson, 2014). Factors such as research evidence, management and pupil data, professional expertise and judgement, and classroom context and classroom learners need to be considered for informing evidence-based practice (Durbin

& Nelson, 2014). Different sources of evidence need to be investigated, including both academic knowledge generated from research and tacit knowledge from teachers' own professional judgement, experience and expertise (Durbin & Nelson, 2014; Slavin, 2002). Teachers need to consult information from books, reports, articles, summaries, training or events when deciding on their approaches to support student progress (J. Nelson, Mehta, Sharples, & Davey, 2017).

However, there have been critiques about evidence-based policy and practice in the literature, particularly regarding the use of randomised experiments for effective practice (Goldacre, 2013). For example, Godfrey (2017) has argued that an overemphasis on what works or evidence-based practice under-powers practitioner claims to knowledge, and that a more nuanced understanding of the relationship between teaching and research evidence is needed, including the role of collaboration, enquiry and social networking.

3.6.3 Why Reflection?

> "…Reflection involves recalling, describing and explaining what happened, as well as thinking about the consequences of what you do. Critical reflection takes this to a higher level. It involves evaluating practice and making the case for change based on solid evidence. This includes being self-critical, questioning the assumptions on which personal beliefs and values have developed, and critiquing the work of others. Critical reflection is a component of reflective practice, which focuses on challenges faced within a professional context. When new insight leads to change or improvement, reflection becomes reflective practice…" (The Welsh Government, 2015, p. 4)

This strand of research focuses on the importance of reflection and reflective practice for practising professionals such as education and health professionals. Reflection is important because reflection can fulfil several functions, particularly in helping to make meaning of complex situation and enabling learning from experience (Chetcuti et al., 2011; Fazio, 2009; Fook et al., 2016; Freese, 1999; Jay & Johnson, 2002; Mann, Gordon, & MacLeod, 2009; Smyth, 1989). Teacher reflection can stimulate the intellectual growth and improvement in one's ability to see the need for personal and system changes and their relevant impact (Stein, 2000).

However, there are not yet agreed-upon approaches to and methods for researching teacher reflection, since teacher reflection is inherently ideological (Fook et al., 2016). Some evidence has focused on the role of teacher reflection in helping teachers develop a broader and more complex sense of professional selves and empowerment, a reframing of ideas about power that allows them to feel more powerful and act in powered ways, a sense of being able to create new choices and a better sense of identity as agency of social change (Fook et al., 2016). Other research evidence has pointed to the critical dimension of teacher reflection, indicating that teachers need to be critically reflective, able to challenge accepted norms and values for the following two distinctive purposes:

> "…The first is to understand how considerations of power undergird, frame and distort so many educational processes and interactions. The second is to question assumptions and practices that seem to make our teaching lives easier but that actually end up working against our own best long term interests - in other words, those that are hegemonic…" (Brookfield, 1995, p. 8)

Indeed, critical reflection can make reflection happen more deeply and more profoundly (Brookfield, 1995, 2009; Fook et al., 2016). It can help teachers take informed actions, develop a rationale for practice, and ground us emotionally (Brookfield, 1995, 2009; Chetcuti et al., 2011; Fazio, 2009; Fook et al., 2016; Smyth, 1989). However, the interplay of power and agency/empowerment related to critical reflection seems highly contextual. There may be a further need to investigate within what boundaries the concept and process could be accommodated for teachers' critical reflection on their professional practice (Jay & Johnson, 2002; Kember, McKay, Sinclair, & Wong, 2008).

In addition, other evidence has addressed a broader concept of reflective practice that not only emphasises the cyclical nature of reflective process but also extends it well beyond to different functions of reflection in, on and for action as a form of professional practice (Dewey, 1933; Schön, 1987; The Welsh Government, 2015; Victorian Department of Education and Early Childhood Development, 2012). Reflective practice is understood as "an ongoing, dynamic process of thinking honestly, deeply and critically about all aspects of professional practice with children and families" (Victorian Department of Education and Early Childhood Development, 2012, p. 3). It is regarded as "a process of thinking through

professional issues, problems or dilemmas, which do not have an obvious solution" (The Welsh Government, 2015, p. 3). Reflective practice is essential for teachers to reflect continuously and systematically upon their professional practice (Fook et al., 2016). Importantly, reflective practice is characterised by a reflective process of collecting information, questioning/analysing, planning, acting/doing and reviewing, and can enable practitioners to reflect critically upon their practice. This reflective process is driven by reflection in, on and for actions that could lead to positive changes and improvement. For instance, reflection-in-action involves tacit knowing and unconscious decision-making as a process of reframing what is happening within the moment (The Welsh Government, 2015). Reflection on action is the reflective process on what has happened, particularly on what could be done differently, whereas reflection for action describes the intent of reflection for future actions. Overall, it has been argued that reflective practice can contribute to "human flourishing" in terms of learners' experience empowerment, their increased competence and confidence and their capacity to deal with uncertainty, manage emotional turmoil and stress (Fook et al., 2016).

3.7 Current State of Collaborative Reflective Enquiry Internationally: Definition, Features and Perceived Benefits

Building on the findings of teacher professional development and PLCs, this section seeks to critically review research evidence relating to the definition, features and perceived benefits of collaborative reflective enquiry (DeLuca et al., 2017; DeLuca et al., 2015; Harris & Jones, 2017; Robinson et al., 2010). Collaborative reflective enquiry has been argued to be a useful approach to teachers' professional development and learning as a form of "co-regulation" (Butler & Schnellert, 2012; Schnellert, 2011). It is closely linked to the PLCs concept and essentially draws upon a collaborative and self-reflective enquiry process of identifying student learning problems, taking evidence-based actions and reflecting on their actions for improving teaching and learning (Katz & Earl, 2010; Schön, 1987; Stoll et al., 2012; Timperley et al., 2007). Collaborative reflective enquiry has been used by teachers to investigate different aspects of professional practice for improving their professional development and student learning (DeLuca et al., 2015; T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010).

3.7.1 What Is the Definition of Collaborative Reflective Enquiry?

The key idea that underpins the concept of collaborative reflective enquiry, in terms of teacher professional development, is that teachers can work collaboratively to enquire about their professional practice for improving student learning within a school environment with the culture of collaboration, reflection and enquiry (Bolam et al., 2005; Brubaker, 2012; Butler & Schnellert, 2012; Butler et al., 2015; Cassidy et al., 2008; Crockett, 2002; D. Huffman & Kalnin, 2003; Katz & Earl, 2010; Learning Forward Ontario, 2011; Opfer, 2016; Roblin & Margalef, 2013; Sinnema et al., 2011; Stoll et al., 2012). One dominant definition of collaborative reflective enquiry, in term of teacher professional development, has been proposed by the Ontario Ministry of Education, Canada as follows:

> "…a process in which participants come together to examine their own educational practice systematically and carefully using techniques of research. It may include as few as two educators or a group of several educators interested in addressing a school, department, division, or classroom issue driven by the consideration of student learning needs. Teams work together to narrow the question, gather and analyse evidence, determine action steps, and share their findings and recommendations" (Learning Forward Ontario, 2011, p. i).

Collaborative reflective enquiry is a self-directed collaborative approach to teachers' professional development and learning and has the potential to foster meaningful changes in teachers' practices (Butler & Schnellert, 2012). It can be understood from the following three perspectives. Firstly, collaborative reflective enquiry reflects teachers' enquiry process of putting forward hypotheses, using data, taking actions and evaluating the impact of the actions through a variety of lenses (Katz & Earl, 2010). It involves both formally and informally questioning, reflecting, seeking alternatives, and weighing consequences, making tacit knowledge visible and open to scrutiny (Katz & Earl, 2010). Secondly, collaborative reflective enquiry recognises the role of the teacher in understanding student learning needs and creating an opportunity for teachers to work together. It empowers teachers to purposefully incorporate the critical processes of collegial communication and reflection into their professional practice (T. Nelson & Slavit, 2008). Thirdly, collaborative reflective enquiry is grounded in teachers' questions, enquiry, experimentation and research on effective practice

(Dimmock, 2016). It encourages teachers to systematically and intentionally explore and consider knowledge from academic research and other sources of information for informed decisions on pedagogical approaches (Furlong et al., 2014; J. Nelson & O'Beirne, 2014; T. Nelson & Slavit, 2008). Hence, these understandings of collaborative reflective enquiry are used in this study to narrow down the scope of the concept of collaborative reflective enquiry, thereby informing the research design.

However, collaborative reflective enquiry may vary, depending on the context of the enquiry, and can be shaped by different contextual factors. For example, the following quote can illustrate how enquiry may be influenced by contexts, dualities or tensions in general:

> "Good educational enquiry, like good teaching itself, depends heavily on context and implies seeking to revolve dualities and applying principles intelligently and with judgement to suit particular circumstances. There are no universal answers...what is required is an awareness of the dualities or tensions and an ability to consider these in relation to other contextual factors, aims and purposes in order to examine, or evolve in practice, an effective set of structures and relationships" (Cassidy et al., 2008, p. 230).

This quote also echoes the overarching complexity theory of this study in relation to the complex evolving systems with effective structures, relationships and interactions. A careful consideration of contextual factors that may shape collaborative reflective enquiry could contribute to a better and more nuanced understanding of different supportive conditions necessary for teacher professional development. The contextual factors may relate to opportunities for participation, the relationships of community participants, perspectives and assumptions underpinning the relationships, the structure and context of the community, community climate, the purpose of the enquiry and the control of the enquirers (Cassidy et al., 2008).

3.7.2 What Are the Features of Collaborative Reflective Enquiry?

Given that research evidence on collaborative reflective enquiry is still emerging, there has not been an international consensus on the features of this concept. For example, the findings of a scoping review of 42 sources have indicated that collaborative reflective enquiry generally follows a cyclical process of "dialogical sharing, taking action, and reflecting"

(DeLuca et al., 2015). Yet, the framework of teacher collaborative reflective enquiry proposed by the Ontario Ministry of Education in Canada has included seven features, with enquiry being "relevant, collaborative, reflective, iterative, reasoned, adaptive and reciprocal" (The Ontario Ministry of Education, 2010). These features can be used to reflect whether teachers' collaborative reflective inquiry is relevant to student learning, whether it is a shared process, whether it is informed by reflection, and whether it generates progressive understandings iteratively (The Ontario Ministry of Education, 2010). The features can be also used to represent whether teachers' collaborative reflective enquiry is reasoned based on evidence use and analysis, whether the enquiry shapes practice, and whether the enquiry connects with other enquiry practices (The Ontario Ministry of Education, 2010). Crucially, the features of "collaborative, reflective and reasoned" that are included in the Ontario framework of collaborative reflective enquiry are directly linked to the professional development and PLCs elements regarding collaboration, reflection and enquiry. These three features can be used to explore the role of collaborative reflective enquiry in promoting teacher professional development, and improving teaching practices and student learning. Therefore, the seven features of teacher collaborative reflective enquiry proposed by the Ontario Ministry of Education have been employed in this study to inform an analytical framework for the qualitative analysis of the interview data, which will be articulated in 4.8.2 Interview Analysis.

In addition, these features are also related to processes of enquiry that are identified in other frameworks of collaborative reflective enquiry in existing literature (Harris & Jones, 2012; T. Nelson & Slavit, 2008; Timperley et al., 2007). The processes of collaborative reflective enquiry share similarities across different contexts such as New Zealand, Australia, US and UK. For example, the processes of collaborative reflective enquiry over time, which are helpfully mapped by Timperley et al. (2007) in the New Zealand context, can reflect the cyclical nature of enquiry as a knowledge-building circle to promote student outcomes. This circle of enquiry starts with identifying the learning needs of both students and teachers, then focuses on the design of tasks and experiences and teaching actions, and ends with examining the impact of teaching actions (Timperley et al., 2007). These processes have been incorporated in the enquiry framework of the Department of Education and Early Childhood Development, State of Victoria, Australia regarding "Using Student Assessment for Professional Learning: Focusing on Students' Outcomes to Identify Teachers' Needs"

(Timperley, 2011). Similarly, three processes of "focus, implementation and evaluation" have been included in the conceptual framework of the background paper for the US Department of Education regarding "Supported Teacher Collaborative Inquiry" (T. Nelson & Slavit, 2008). These processes start with establishing a focus of enquiry through developing a vision for teaching and learning and comparing current practice to vision for formulating enquiry questions. Then the processes focus on developing implementation plan for monitoring and analysis, and subsequently end with evaluating the implications for changing practice (T. Nelson & Slavit, 2008). Likewise, the processes of "implementation, innovation and impact" have been proposed by the NCSL in the UK in its collaborative reflective enquiry framework (Harris & Jones, 2012). The processes relate to establishing enquiry team and the focus of the enquiry, selecting enquiry methods, selecting, trialling and refining strategies, collecting data and evidence and defining and disseminating outcomes and impact (Harris & Jones, 2012). Overall, all the processes relate to the key features of collaborative reflective enquiry, but need to be contextualised in specific contexts.

3.7.3 What Are the Perceived Benefits of Collaborative Reflective Enquiry?

In terms of the perceived benefits of collaborative reflective enquiry, some evidence in the literature has suggested that collaborative reflective enquiry can positively influence teacher engagement and commitment (Harris & Jones, 2017; D. Huffman & Kalnin, 2003; Rose et al., 2017), teacher efficacy and agency (Butler et al., 2015; DeLuca et al., 2017), teacher professional learning (Carpenter, 2017; T. Nelson & Slavit, 2008) and educational change (Butler & Schnellert, 2012), and teacher instruction and student learning (DeLuca et al., 2017; Galligan, 2011; Robinson et al., 2010; Sinnema et al., 2011).

For example, in terms of the perceived benefits of collaborative reflective enquiry on teacher engagement and commitment, the findings of a small scale mixed methods study in the US have suggested that collaborative reflective enquiry can enable teachers to engage in a continuous improvement process which allows them to take more ownership over local data for decision-making (D. Huffman & Kalnin, 2003). This study evaluated the impact of a collaborative enquiry project on data-based decision making, in which educators used Minnesota data and results of the "Trends in International Mathematics and Science Study" (TIMSS) to inform improvement in curriculum, instruction and achievement (D. Huffman &

Kalnin, 2003). The findings of this study have indicated that the impact at the individual level depends upon whether the enquiry could update teachers' philosophy of education, improve their ability to conduct research, increase their collaboration with colleagues and ultimately improve their classroom teaching. The impact at the school level relates to whether the enquiry could enhance schools' capacity to use data for decision-making in order to improve student learning (D. Huffman & Kalnin, 2003). These findings can shed light on the understanding of teachers' collaborative reflective enquiry in the present study. Moreover, the findings of a qualitative study in eight Australian schools have indicated that authentic collaborative reflective enquiry can promote meaningful teacher engagement, offer teachers clear guidelines about the processes of active collaboration and its evaluative requirements, and emphasise improvements in student learning as main outcomes of collaborative reflective enquiry work (Harris & Jones, 2017). This study investigated a collaborative reflective enquiry model and evaluated the impact of teacher learning, including data sets of a baseline assessment, a model charting progress against a rubric, documentary analysis, and an online portal. It employed a sequenced data collection and evaluative approach to capture the process and the progress of the enquiry work over the two-year period. Meaningful teacher engagement has been highlighted as a key benefit. In the UK context, a positive impact of research learning communities on teachers' disposition towards research has been found in the EEF evaluation project using a randomised controlled trial (Rose et al., 2017). This study aimed to improve teaching quality and learning outcomes by raising teachers' use of research in research learning communities. Attitude towards research engagement has been highlighted as a key teacher outcome.

Furthermore, the results from a longitudinal case study in Canada have indicated that teachers' efficacy can increase if engaging in collaborative reflective enquiry (Butler et al., 2015). This study investigated the relationship between educators' self-perceptions of efficacy and agency and their engagement in inquiry-based initiatives. It has been found that preserving teachers' agency could support teachers sustained enquiry practice. However, this needs to be carefully investigated in contexts where teachers' agency is more constrained such as the context of the present study. Similarly, the findings of another small scale mixed methods study in the Canadian context have suggested that collaborative reflective enquiry can enhance teachers' confidence and increase their attention to teacher reflection for

professional development and learning (DeLuca et al., 2017). This indicates that teachers' participation in collaborative reflective enquiry practices can significantly facilitate teachers' reflection.

With regard to the perceived benefits of collaborative reflective enquiry on teacher professional development and learning, the findings of five case studies of science and mathematics teachers engaging in collaborative reflective enquiry in the US context have indicated that dialogic inquiry grounded in classroom-based data is a key element in teachers' professional growth (T. Nelson & Slavit, 2008). Different trajectories have been found in teachers' professional growth through enquiry cycles, with a variation of teachers' collaboration in different PLCs (T. Nelson & Slavit, 2008). This indicates the importance of examining the variation of teachers' collaboration in the present study. Likewise, the results of a qualitative study that explored teacher collaborative reflective enquiry in the shared workspace within PLCs in the US have suggested that positive collaborative physical interactions and intellectual discourse through collaborative reflective enquiry processes can lead to teacher professional learning (Carpenter, 2017). This still relates to the key factor of teacher collaboration. More broadly, the findings of an in-depth case study of collaborative reflective enquiry in Canada have suggested that relationships within collaborative reflective enquiry are varied and complex, and teacher enquiry has the potential to foster meaningful changes in practice (Butler & Schnellert, 2012). It has been argued that providing time, resources and structured opportunities could encourage more collaborative reflective enquiry practices amongst teachers. Overall, these findings are highly relevant to the collaborative reflective enquiry of the present study.

In terms of the impact of collaborative reflective enquiry on teacher instruction and student learning, the findings of the project conducted by the New York City Department of Education regarding collaborative reflective enquiry have supported collaborative reflective enquiry as a powerful process of helping school leaders and teachers use data to improve teacher instruction and student learning (Robinson et al., 2010). The findings are based on qualitative data collected from 213 interviews and 37 observations in 13 schools. It has been revealed that teachers' participation in collaborative reflective enquiry practices can develop teachers' capacity in supporting students who are struggling, and strengthen teachers' understanding

of using student assessment data to improve instructional decision-making (Robinson et al., 2010). This finding is closely linked to the need for building teachers' professional capacity in rural China. Besides, it has also been found that school leadership is an important factor affecting teachers' participation in collaborative reflective enquiry, and that there is a need for schools to provide teachers with essential conditions and support for facilitating collaborative reflective enquiry (Robinson et al., 2010). This is similar to what has been reviewed on teacher professional development as mentioned earlier. Similarly, a positive influence of collaborative reflective enquiry on student learning is found in a qualitative study that investigated the impact of a collaborative reflective enquiry project on teacher practices based on data from 26 primary and secondary teachers in New Zealand before, during, and after a year-long research and development (Sinnema et al., 2011). The results of this study have suggested that teachers' engagement with evidence-informed collaborative reflective enquiry can both support and challenge teachers to improve their classroom practice (Sinnema et al., 2011). This aspect of classroom practice is highly relevant to the focus of teachers' collaborative reflective enquiry in the present study. Besides, one small scale mixed methods study that examined the impact of collaborative reflective enquiry on teachers' efficacy and students' writing achievement in the US context has shown that collaborative reflective enquiry is likely to positively affect students' writing achievement (Galligan, 2011). In addition, the findings of another small scale mixed methods study in Canada have suggested that collaborative reflective enquiry can affect students' mind-set in learning through collaborative reflective enquiry, their commitment to learning and academic growth (DeLuca et al., 2017). Yet, the impact of collaborative reflective enquiry on student outcomes can be indirect. The findings of this study have also highlighted factors that can enhance collaborative reflective enquiry regarding time, teacher choice of enquiry focus, teacher expertise and their trusting relationships with colleagues (DeLuca et al., 2017). These factors are important in informing the research focus of the present study, especially given the implications of the findings on teachers' choice of enquiry focus.

Nevertheless, dilemmas of teacher collaborative reflective enquiry exist. For example, factors that inhibit collaborative reflective enquiry are identified such as a lack of facilitating structures and support for enquiry processes, teachers' fear of exposing personal weaknesses, teachers' views of collaborative reflective enquiry as add on for teachers and

being irrelevant to their own practice (DeLuca et al., 2017). Similarly, it is found in another qualitative study that interpersonal and intrapersonal dilemmas are likely to co-occur when teachers' pervious beliefs on teaching and learning are challenged, which highlights teachers' dilemmas of engaging with collaborative reflective enquiry practice (Roblin & Margalef, 2013). Both findings have suggested a need for further research across contexts to address specific structures and support for collaborative reflective enquiry, such as the Collective Lesson Planning and Teaching and Research Groups in the present study. Further research is needed to explore teachers' views of different contextual challenges that teachers face whilst engaging with collaborative reflective enquiry practices.

3.8 Current State of Teacher Professional Development, PLCs and Collaborative Reflective Enquiry in China: A Need for Creating Supporting Conditions and Strengthening Teachers' Professional Capacity in Collaboration, Reflection and Enquiry

This section critically reviews the current state of teacher professional development, PLCs and collaborative reflective enquiry in China, and presents research evidence by focusing on typical characteristics or features of these concepts and their impact on student achievement. One key finding emerging from the research evidence has indicated a need for creating supporting conditions and strengthening teachers' professional capacity in collaboration, reflection and enquiry in China, particularly in rural China.

3.8.1 Teacher Professional Development in China

Evidence regarding teacher professional development in China will be reviewed in this section, focusing on high quality characteristics, the impact of teacher professional development on student achievement and the supporting conditions as well as relevant theoretical developments. In terms of the high quality characteristics of teacher professional development in China, some empirical evidence has indicated features of collaboration, content focus and the form of the activity (Ding et al., 2011; Thomas & Peng, 2014). For example, the "Improving Teacher Development and Educational Quality in China" (ITDEQC)[7] project have investigated the form of the activity relating to a variety of professional

[7] For details about the ITDEQC project, please visit: http://www.bristol.ac.uk/education/research/sites/ieeqc/

development activities in China such as courses, workshops, education conferences, seminars, mentoring and coaching, reading professional literature, informal dialogue and Teaching and Research Groups activities (Thomas & Peng, 2014; Thomas et al., 2013). This project was jointly funded by the United Kingdom Economic and Social Research Council (ESRC) and Department for International Development (DfID), which examined the nature and extent of teachers' professional development and learning in China and included survey data collected from 17,000+ teachers and 300,000+ students across Eastern and Western China. Based on the project findings, peer observation, informal dialogue and Teaching and Research Groups activities are considered to have the largest impact on teachers' professional development, although the reality of individual reflective enquiry has been questioned by some teachers (Thomas & Peng, 2014). In terms of content knowledge, the results of the "Status Investigation of Teacher Professional Development in Chinese Primary and Secondary Schools" research project have suggested a generally positive response from Chinese teachers towards the content knowledge of teacher training and development in the Chinese context, although the practicality and usefulness of the training provision has been questioned (Ding et al., 2011). This project was funded by the Chinese Ministry of Education and led by the East China Normal University, with the support of the National Centre for Education Development Research. It investigated Chinese teachers' professional development practice based on survey data collected from 11,190 teachers across 9 different provinces, municipalities and autonomous regions in mainland China (Ding et al., 2011). The evidence of this project has also highlighted the importance of Teaching and Research Groups activities in teachers' professional work and lives (Ding et al., 2011).

Teacher experience and qualification are important factors for teachers' professional development in China (Ding et al., 2011; Ho, Lee, & Teng, 2016; Thomas & Peng, 2014; Thomas et al., 2018). For example, it is found in the ITDEQC project that junior teachers focus on practical pedagogical subject knowledge and basic teaching skills, while experienced teachers centre on theoretical knowledge and reflective teaching practices (Thomas & Peng, 2014). It is suggested in the Status Investigation of Teacher Professional Development project that teachers' workload varies depending on their experience (Ding et al., 2011). Beginning and junior teachers tend to have higher workload. Also, it is found that teachers' qualification is

likely to positively affect teachers' professional development and learning in China (Ding et al., 2011; Ho et al., 2016).

In addition, other important factors influencing Chinese teachers' professional development are associated with teacher motivation, commitment, self-efficacy and job satisfaction as well as expectations for students. For example, some teachers generally feel motivated to participate in professional development by incentives (e.g. recruitment, evaluation and promotion), indicating the issue of teacher commitment (Ding et al., 2011). Also, it seems that teachers' self-efficacy remains unbalanced between male and female teachers as well as across teachers of different subject areas (Ding et al., 2011). Besides, the findings of the "Gansu Survey of Children and Families" (GSCF)[8] jointly funded by the ESRC and DfID have indicated, in terms of teachers' job satisfaction in rural Northwest China, that indicators of economic development, such as village income, presence of village enterprise and contributions of the village collective to the school are negatively associated with teacher satisfaction after other factors controlled (Sargent & Hannum, 2005). This indicates a contextual issue in rural Northwest China that teachers are likely to feel less satisfied if the perceived availability of teaching alternatives improves with economic development. Nevertheless, teachers' job satisfaction may vary depending on teacher background and school types (Ding et al., 2011). Furthermore, it is found, on the basis of the GSCF project, that teachers in rural Northwest China are more likely to hold lower expectations for students with disadvantaged backgrounds. Non-local teachers hold lower expectations for rural children compared to local teachers (Yiu & Adams, 2012). This implies that, in order to address the issue of teacher expectations for students in rural China, LEAs may need to examine their teacher recruitment policies more carefully and focus on the ways of raising teachers' expectations for rural students.

With regard to the impact of teacher professional development on student achievement in China, the empirical evidence is generally limited, and the results are mixed. For example, the ITDEQC findings have indicated a positive link between teacher professional development factors and students' value-added progress (Thomas, 2020). These findings have revealed

[8] For details about the GSCF project, please visit: https://china.pop.upenn.edu

significant differences in schools' raw and value-added performance in the university entrance examination results, and these differences vary not only across regions and subject outcomes but also in relation to trends over time (Thomas, 2020). However, some evidence has suggested no significant impact on student achievement. For example, no impact on students' English test scores has been found in a small-scale study which examined the impact of an intensive, short-term in-service teacher training programme on teacher and student outcomes, using randomised experiment in Beijing migrant schools (L. Zhang, Lai, Pang, Yi, & Rozelle, 2013). The sample of this study included 123 English teachers and 8,387 students. Similarly, no impact of teacher professional programme on students' Mathematics achievement in Rural China has been found in another small-scale study examining a National Teacher Training Programme on student achievement in Shaanxi Province, Northwest China (M. Lu et al., 2019). 84 teachers (34 treatment teachers, 16 within-school control teachers and 34 across-school control teachers) and 3,289 students were sampled for the baseline survey.

Relevant to the impact of teacher professional development on student achievement, the GSCF findings have indicated that teachers' official credentials, motivation and commitment and interpersonal skills are positively associated with student achievement in rural China (Adams, 2012). Higher official credentials are identified to have a positive impact on student achievement in China (Chu et al., 2015). Also, the GSCF results have indicated that teaching style, the quality of teacher-student interactions and student academic engagement play a significant role in improving student learning outcomes (An, Hannum, & Sargent, 2008). Overall, these findings indicate that teachers' professional development in rural China could be promoted by focusing on improving teachers' credentials, motivation and commitment and relevant teaching factors.

In terms of the supporting conditions for teacher professional development in China, evidence has shown that teacher training and development is provided primarily by Normal Universities and supported by other comprehensive universities (Ding et al., 2011). Also, it is found in a large-scale survey which examined the effects of fiscal centralisation on the relationship between local governance and school district management in rural district schools of Western China that teachers' incentives and student achievement are unlikely to

benefit from the excessive centralisation of decision-making power (M. Liu, Murphy, Tao, & An, 2009). The sample of the survey comprised 103 primary schools and 70 junior secondary schools, and included data from 223 district governors or headmasters, 910 teachers and 518 parents.

Besides, evidence has indicated the issue of urban-rural disparities in China (Ding et al., 2011; Hannum et al., 2011; Thomas & Peng, 2014). For example, the ITDEQC findings have highlighted the inequalities of education resources between areas, indicating stronger professional development needs in the Western region (Thomas & Peng, 2014). Similarly, it is shown in the GSCF project that secondary school and university entrance exam results play an important role in determining student transitions to secondary and tertiary education as well as the type of education students receive and can reinforce educational inequalities, leading to disparities in educational opportunity (Hannum et al., 2011). Likewise, the findings of the Status Investigation of Teacher Professional Development in China have highlighted the prominent urban-rural disparities of teachers' professional development in their characteristics, knowledge and teaching skills (Ding et al., 2011).

In addition, the empirical evidence of a Special Issue entitled "the Work, Lives and Professional Development of Teachers in China"[9] published in the Asia-Pacific Journal of Teacher Education has pointed to a focus on the emotional and attitudinal aspects of Chinese teachers' work in relation to their professional development (Gu, 2013). For example, it has been argued that Chinese teachers' professional development can be shaped by different social, cultural and political factors (Gu, 2013). As evidenced by the empirical findings of a mixed methods study investigating how Chinese teachers could sustain their sense of resilience and commitment in the context of educational reform in China, the resilience of Chinese teachers depends on the workplace-based and personal influences, and carries a meaning beyond quick and efficient recovery from difficulties (Gu & Li, 2013). The emotional aspects of Chinese teachers' professional development and learning matter for their commitment, resilience, identities and beliefs (Gu, 2013; Gu & Li, 2013). These findings have indicated the importance of sustaining Chinese teachers' commitment and resilience in China

[9] For details about this special issue, please visit: https://www.tandfonline.com/toc/capj20/41/3?nav=tocList

and particularly the complexity of supporting teachers' professional development in different working conditions, such as the research context of the present study. Similarly, factors that can shape teachers' professional identify have been identified in a qualitative study that explored the changing professional identifies and emotions of teachers in the context of curriculum reform in China (J. C.-K. Lee, Huang, Law, & Wang, 2013). These factors are related to personal experiences inside or outside school, policy changes, tensions between curriculum reform and examination culture and between curriculum intentions and practical realities as well as institutional context (J. C.-K. Lee et al., 2013). Likewise, it has been found in a qualitative study that teachers have been stretching their professional capacity to satisfy the competing reform demands, in terms of the impact of reform policies on teachers' work and professionalism in mainland China (Lo et al., 2013). Besides, strategies for promoting teacher development in China have been investigated in three case studies that explored how school principals could promote teacher professional development in their schools in response to curriculum reform (Qian & Walker, 2013). The strategies are related to using data to inform teacher development decisions, selecting and tailoring teacher development strategies to their own contexts, establishing a collaborative school culture and using action research as a tool to promote teacher professional development (Qian & Walker, 2013). Overall, all the above findings have indicated that sustaining Chinese teachers' commitment and resilience and providing teachers with collaborative school culture and relevant enquiry tools are particularly important for their professional development and learning, especially in the context of the new curriculum reform.

Apart from the substantive empirical evidence on teacher professional development in China, other conceptual evidence relating to the theoretical developments of teacher professional development in the Chinese context has focused on its theoretical foundations and/or models and approaches (X. Chen, 2013; Kang, Li, Ma, Li, & Jiang, 2011; N. Lu & Zhong, 2007; Z. Lu, 2007; Ren, 2010; G. Song & Wei, 2005; Yang & Yang, 2013; Zhu, 2014). For instance, in terms of the theoretical foundations of teacher professional development in China, a conceptual model of teacher professional development has been proposed by Zhu (2014), consisting of dimensions of purpose, level, content and mechanism. Zhu (2014) has argued that the core purpose of teacher professional development in China is to enhance student learning, promote students' all-around development and develop students' awareness of community

services. Zhu (2014) has also argued that teachers need to take the responsibility to develop themselves professionally at different levels, from a lower level regarding their experience in undertaking professional development activities to a higher level associated with deeper understandings of their experience and to a further higher level relating to their values for professional development and learning. Similarly, it is argued that teachers need to develop their knowledge, skills and character dispositions through different approaches such as experience and reflection, and use of both evidence and data, and theoretical concepts and thoughts (Yang & Yang, 2013; Zhu, 2014).

Also, approaches to teacher professional development in China have been discussed. For example, Ren (2010) has proposed a sustainable eco-friendly approach to professional development which focuses on better inclusivity and practicality. This approach is related to strategies of reflecting upon teaching practices, enhancing teacher professionalism, developing teacher PLCs and implementing multi-dimensional evaluation, which are similar to some of the PLCs features mentioned in previous sections. The approach is conceptualised based on a critique of a traditional approach to teacher professional development in China which is argued to overemphasise educational theories and knowledge but lack sufficient attention to educational practice. Moreover, Kang et al. (2011) have conceptualised an approach to teacher professional development in China which centres on mutual support and collaborative learning. It is argued that attention needs to be given to the culture of resource sharing and community interactions in schools. Teachers' professional development could be promoted through approaches of centralised training, school-based development, mentoring and coaching, practitioner enquiry and performance-based evaluation (Kang et al., 2011). It can be noticed that the above aspects are closely linked to PLCs and collaborative reflective enquiry practices. Similarly, Yang and Yang (2013) have proposed an approach of "self-organisation" to teacher professional development, echoing complexity theory, and have focused on supporting mechanisms of practice and reflection, interaction and dialogue, self-narratives and research. Different development stages of professional development have also been identified such as from being adaptive, to experience-based and knowledge-based, and to mixed and researcher-alike (Z. Lu, 2007). Although the models and approaches discussed above are more conceptual in nature, many aspects such as enquiry, use of evidence and data, reflection, collaboration and community interactions are useful in informing a concept

that combines the elements across these models and approaches, such as the concept of collaborative reflective enquiry in the present study.

Overall, it is found that the evidence on the theorisation of and approaches to teacher professional development in China is relatively more conceptual, despite some emerging empirical evidence (Ding et al., 2011; Thomas & Peng, 2014). Further research is needed to provide and compare detailed and nuanced views across regions, especially on high quality characteristics of teacher professional development such as collaboration. Urban-rural disparities of teacher professional development in China seem prominent, and further research is needed to investigate both urban and rural contexts in more depth, particularly the rural context. It is also essential to explore the emotional and attitudinal aspects of teacher professional development, which are influenced by higher demands for changes in teachers' professional knowledge, skills and character dispositions due to the curriculum reform and exam-oriented assessment system. Further research is needed to examine the impact of teacher professional development on student achievement in order to further refine the mixed findings in the literature.

3.8.2 PLCs in China

Compared with the above review on teacher professional development in China, it seems that there is more PLCs research evidence flourishing in the Chinese context. Positive evidence that has explored the importance of PLCs in improving pedagogical approaches in China can be found, even in resource-constrained Chinese context (L. Chen, 2020; Hairon & Tan, 2017; Sargent, 2015; Sargent & Hannum, 2009; Thomas et al., 2017; Thomas et al., 2018; D. Wang, Wang, Li, & Li, 2017; T. Wang, 2015, 2016; Wong, 2010; J. Zhang & Pang, 2016; J. Zhang, Yuan, & Yu, 2017). This finding is particularly relevant to the focus of this study on collaborative reflective enquiry, given its alignment with the overarching rationale of the present study outlined in Chapter 1 Introduction.

In terms of the PLCs features in China, the findings of the ESRC-DfID funded ITDEQC project mentioned in previous sections have shown that shared value and visions, collective responsibility for student learning, collaboration focused on learning, and group as well as

individual professional learning are considered to be the most developed PLC features in China (Thomas et al., 2017). However, the most challenging PLCs features are reflective professional enquiry and inclusive membership (Thomas et al., 2017). Teachers seem to be less certain about the relevance of PLCs to their own school in the Western region (Thomas & Peng, 2014). Thus, further research is needed to clarify this aspect. Also, review evidence of PLCs research in mainland China (2006-2015) has shown that the concept of PLCs in the Chinese context is typically characterised by structural teacher collaboration that is associated with Teaching and Research Groups (Qiao et al., 2018). Other evidence has supported this evidence that intentionally arranged school structures with genuine collegiality could contribute to the establishment of a system of focused collaboration, peer mentoring and collective responsibility, leading to improved teaching and learning (T. Wang, 2015). Structural teacher collaboration could support PLCs practices in China. However, it is worth noting that structural teacher collaboration is relatively formal and may need to be supported by informal teacher collaboration and dialogues. Moreover, the findings of the ESRC-DfID funded GSCF project in relatively poor Gansu Province, China mentioned in previous sections have indicated that there is a strong relationship between participation in school-level PLCs and the tendency for teachers to align themselves with the use of new methods that are advocated by the new curriculum reform (Sargent, 2015). This indicates a further need to explore the role of PLCs and related aspects such as collaboration and enquiry in promoting teachers' professional development in rural China, which is in line with the academic rationale of the present study.

Besides, evidence on PLCs in China has shown that the concept of PLCs is highly contextual, and PLCs practices can be shaped by different socio-cultural, organisational and individual factors such as institutional support, principal leadership and teachers' own initiatives (X. Cheng & Wu, 2016; Hannum et al., 2011; Sargent, 2015; Sargent & Hannum, 2009; Wong, 2010). For example, the findings of a small-scale survey that investigated the development of PLCs in Shanghai and Southwest China have suggested that PLCs practices in China vary between the Eastern and Western regions (J. Zhang & Pang, 2016). This finding is based on survey data of 324 teachers in 13 schools from Shanghai and Mianyang. Also, some evidence has shown that it is less likely for rural schools in the Western region to develop strong PLCs due to relatively constrained resources, limited school or teacher networks, and/or different

educational, social, economic and cultural differences (Qiao et al., 2018; D. Wang et al., 2017; J. Zhang & Pang, 2016). This indicates a further need to explore the concept of PLCs in the rural context of Western China, which is closely linked to the focus of the present study. Moreover, it is found that socio-cultural factors such as collectivist values, authoritarian-oriented practices and influences of interpersonal relationships could shape the development of Chinese PLCs (Wong, 2010). Different school organisational contexts such as time, space, school size, teacher motivation could influence Chinese PLCs (Sargent & Hannum, 2009). The extent to which school leaders demonstrate instructional leadership plays a critical role in developing and sustaining PLCs practices in Northeast China (T. Wang, 2016). Relevant to this finding, the results of a large-scale survey that investigated a mediated-effects model of principal instructional leadership and teacher learning in China have indicated that principal instructional leadership has moderate direct and indirect effects on teacher professional learning (S. Liu & Hallinger, 2018). This study employed survey data collected from 3,414 teachers and 186 principals in 186 secondary schools in Qingdao City, Shandong Province, China. In addition, evidence from another large-scale survey has shown that teacher qualifications can impact on PLCs activities. The level of teachers' perceptions of the PLC activities may increase, as the percentage of bachelor's degree holders increases (Ho et al., 2016). This finding is based on a survey sample of 2242 teachers and administrators from 189 preschools in Hong Kong in a study which examined the relationships between school-level qualifications and teachers' perceived PLCs practices. Besides, it has been argued that social and individual "affordances" could shape teachers' individual and PLCs growth (X. Cheng & Wu, 2016), and more importantly teachers' motivation and agency play a crucial role in shaping PLCs practices (Qiao et al., 2018). Overall, these studies with relatively strong research evidence have demonstrated the significance of school-level and teacher-level factors associated with PLCs practices in China.

However, some evidence has shown that there may be a need to address further the PLCs practices associated with "collaborative activity", "collective focus on student learning" and "reflective dialogue" in China (OECD, 2016b). This is because the OECD TALIS 2013 evidence indicates that the scores of the scales on collaborative activity, collective focus on student learning and reflective dialogue in Shanghai-China are slightly below the average of OECD countries (OECD, 2016b). Nevertheless, it can be argued that this finding is only based on data

collected from Shanghai rather than other parts of China and needs careful interpretation. In line with this finding, other evidence has also suggested a need to promote more genuine and authentic collaborative learning culture for critical, meaningful and deep conversations amongst Chinese teachers (Qiao et al., 2018; J. Zhang et al., 2017). Moreover, the development of PLCs may be challenged by contextual and school factors such as school leadership. For example, teachers in Shanghai have reported that ineffective school leadership, insufficient collaborative time, unfavourable accountability policy and a lack of collaborative professional culture are the main barriers for PLCs development in Shanghai schools (J. Zhang et al., 2017). It has also been reported that a lack of financial independence, external resources, teacher motivation and accountability is considered by school leaders to be stifling PLCs development (J. Zhang et al., 2017). Similarly, the factors of heavy teacher workload, ambiguities in the understanding and implementation of PLCs, and hierarchical work structures could prevent schools from improving their PLCs practices in Shanghai (Hairon & Tan, 2017). Overall, all the above findings have indicated the context specificity of PLCs and the need for further research to investigate the extent to which PLCs practices may be shaped by different organisational, school or individual factors.

In terms of the impact of PLCs, some evidence in China has shown that PLCs can positively affect teacher efficacy, commitment and empowerment. For instance, evidence has indicated that the PLCs dimensions of collaborative activity, collective focus on student learning, de-privatised practice, and reflective dialogue can positively predict teacher self-efficacy (X. Zheng, Yin, & Li, 2019). This finding is based on the results of a large-scale survey that examined the relationships amongst instructional leadership, PLCs and teacher self-efficacy in China with survey data from over 1000 school teachers (X. Zheng et al., 2019). Similarly, the findings of another large-scale survey that examined the impact of PLCs, faculty trust and teacher efficacy on teacher commitment in Hong Kong have shown that the PLCs factors of collective learning and application and supportive conditions and structures as well as faculty trust and teacher efficacy have a significantly positive impact on teachers' commitment to students (J. C.-K. Lee, Zhang, & Yin, 2011). Multilevel analysis has been conducted on the basis of a survey sample of 660 teachers from 33 schools. Apart from that, other survey evidence has shown that the establishment of PLCs could potentially promote teacher empowerment for teachers' professional learning and growth (H. Song, 2012). This finding is based on a

survey of 32 high schools in three cities in mainland China. However, despite the links between PLCs and teachers' self-efficacy, commitment and empowerment, it can be noticed that rare research has been conducted to examine directly the impact of PLCs on student achievement in China, which is an issue that needs to be addressed further.

Overall, results have indicated that there has been emerging empirical, including quantitative, PLCs evidence in China which investigates typical PLCs features and related contextual or teacher outcome factors. The evidence has been based on research employing quantitative (e.g. teacher surveys) or qualitative (e.g. teacher interviews or case studies) research methods. However, few studies have used mixed methods approaches to investigating PLCs practices in China. The impact of PLCs on student achievement in the Chinese context is rarely examined.

3.8.3 Collaborative Reflective Enquiry in China

Arguably, there is a lack of conceptual and empirical research on collaborative reflective enquiry in China. Very limited evidence can be found in the Chinese context regarding the concept of collaborative reflective enquiry which combines the three key elements of collaboration, use of research and evidence, and reflection, although some attempts have been made to explore this topic in China. For example, the findings of a PLCs case study exploring teacher educators' collaborative reflective enquiry practices have shown that essential features of teacher educators' collaborative reflective enquiry that could potentially facilitate teachers' professional development and learning in China include narratives as a way of constructing knowledge, and collaborative reflection as way of understanding (Ying, 2007). It has been argued that collaborative reflective enquiry plays a significant role in the process of building knowledge, and could be influenced by factors of common interests, shared experiences, trusting relationships, institutional constraints and personal constraints (Ying, 2007). The findings of a qualitative study which investigated two university teachers' collaborative reflective enquiry practice of setting up action research enquiries as a way of enhancing professional development and learning have suggested that teachers' collaborative reflective enquiry practice in China could be facilitated through collaboration and shared values (Li & Laidlaw, 2006). Moreover, Spires et al. (2019) have explored Chinese

and American teachers' views of the assets and challenges of conducting collaborative reflective enquiry as a pedagogical approach with their students. The findings based on the theories of cosmopolitanism and collaborative reflective enquiry as a pedagogy have suggested that the assets of promoting global citizenship and interpersonal skills are crucial for teachers' collaborative reflective enquiry with students in China, and challenged by digital access and sustainable external support. The findings have also outlined four dimensions of educational cosmopolitanism relating to hospitality, reflexivity, intercultural dialogue, and transactions of perspectives.

3.9 Summary

To conclude, this chapter has critically reviewed different strands of literature relating to teacher professional development, PLCs and collaborative reflective enquiry both internationally and in China. It focuses on the definitions, features and impacts of these three concepts respectively. This chapter has detailed how the concept of collaborative reflective enquiry has been framed and understood in the light of the substantive findings of teacher professional development and PLCs. For example, strong evidence has been identified internationally regarding the characteristics and/or features of professional development and PLCs, and the impact of these characteristics on student achievement. However, despite some emerging evidence on the characteristics of teacher professional development and PLCs in China, very few studies have examined directly the impact of PLCs on student achievement in the Chinese context.

Also, this chapter has proposed a conceptual framework of collaborative reflective enquiry which comprises three key elements of collaboration, use of research and evidence and reflection based on the evidence of teacher professional development and PLCs. It is noticed that there is more evidence on collaborative reflective enquiry in the international literature, although the evidence is not as strong as that of teacher professional development and PLCs internationally. However, there is a lack of conceptual and empirical research on collaborative reflective enquiry in China. Very few studies have explored systematically collaborative reflective enquiry in the Chinese context, especially in terms of its concept, typical features, perceived benefits, challenges and strategies. This indicates a need for exploring collaborative

reflective enquiry in China, particularly in rural China. Therefore, a revised conceptual framework has been proposed as follows to frame the concept of collaborative reflective enquiry within the frameworks of PLCs and teacher professional development, which consists of three key elements and highlights the importance of the broad context.

Figure 4. Revised Conceptual Framework of Collaborative Reflective Enquiry

Chapter 4 Methodology

4.1 Introduction

This chapter presents details regarding the research design and methodology of this study. This study was designed to explore the nature, extent, concept, typical features and perceived benefits of collaborative reflective enquiry in rural Sichuan Province, China. It particularly set out to identify the challenges for teachers' collaborative reflective enquiry, and the strategies that could improve their collaborative reflective enquiry practices in a rural Chinese context, addressing the following three research questions:

RQ1. To what extent do teachers in three secondary schools of rural Sichuan Province, China report engagement in professional development, PLCs and collaborative reflective enquiry? Are there any differences in teachers' responses according to factors of school and teacher experience?

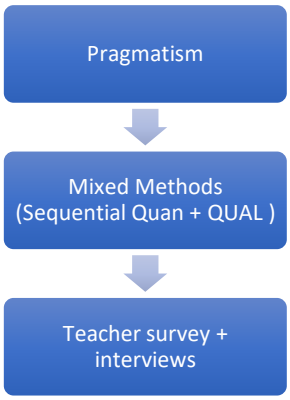
RQ2. What are the views of teachers in three secondary schools of rural Sichuan Province, China on the concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges for their collaborative reflective enquiry practices?

RQ3. What are the views of teachers in three secondary schools of rural Sichuan Province, China on the strategies that could improve their collaborative reflective enquiry practices?

The concept of collaborative reflective enquiry was situated within the frameworks of PLCs and teacher professional development reviewed in Chapter 3 Literature Review (Bolam et al., 2005; Louis et al., 1996; OECD, 2016b; Timperley et al., 2007). It was conceptualised on the basis of previous research with three key elements regarding collaboration, use of research and evidence, and reflection (Harris & Jones, 2012; T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007). A sequential mixed methods approach (Quan + QUAL) (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2006) was employed to investigate rural Chinese teachers' collaborative reflective enquiry practices.

Overall, the design of the study was informed by the work of Crotty (1998), following a rationale from philosophical assumption to methodology and then to methods.

Table 6. Research Design

Crotty (1998)	Research design of this study
	

This chapter starts with an overview of the philosophical approach to research design and justifies the methodology and methods used in this study. It then presents the development details of research instruments in relation to teacher questionnaire and interview schedule. The chapter subsequently details the data sampling, collection and analysis of both teacher survey and semi-structured interviews. Issues of validity, reliability and trustworthiness are critically discussed, along with ethics and methodological limitations. The chapter ends with a brief summary of the research design and methodology.

4.2 Philosophical Approach to Research Design

The philosophical approach to the design of the study is pragmatism (Creswell, 2009; Greene, 2008; Johnson & Onwuegbuzie, 2004; Morgan, 2007, 2014). Pragmatism provides a pragmatic epistemological stance associated with particular ontology, epistemology and methodology and is used in this study to underpin both quantitative and qualitative methods for exploring teachers' collaborative reflective enquiry practices. Ontologically, pragmatism rejects the traditional dualisms where arguably reality only consists of one out of two completely different assumptions regarding matter and mind (e.g. objectivism vs subjectivism) (Johnson & Onwuegbuzie, 2004). Pragmatism is in line with the researcher's view on knowledge and reality that knowing is not solely premised on the wholly objective (universal) matter or on

the purely subjective (individual) mind (Johnson & Onwuegbuzie, 2004). The known and the knower are inseparable. Whilst there is objectivity in the world, reality is subject to human being's different interpretations. Both the nature of the outside world and the world of human being's conceptions are equally important, just like two sides of the same coin (Morgan, 2014).

Epistemologically, pragmatism emphasises that knowledge is acquired through the ways in which we engage with the world, especially through a problem-solving and action-focused process (Greene, 2008). This argument is particularly relevant to the focus of this study on collaborative reflective enquiry that is intrinsically about a learning process of professional enquiry and reflection. The problem-solving process of pragmatism focuses on the practical use of research results in the social world, alongside an action-focused process. This action-focused process emphasises a continuous circle of movement between beliefs and reality, and between actions and consequences. It starts with recognising a problematic situation and considering the difference it makes to define the problem, then moves to developing possible actions and evaluating the likely consequences of potential actions, and ends with taking actions to address the problem (Dewey, 1933; Morgan, 2014). It has been argued that this whole action-focused process is associated with the concept of "experience", which can be understood as follows:

> The organism acts in accordance with its own structure, simple or complex, upon its surroundings. As a consequence, the changes produced in the environment react upon the organism and its activities. The living creature undergoes, suffers, the consequences of its own behaviour. This close connection between doing and suffering or undergoing forms what we call experience. (Dewey, 1920, p. 129).

Pragmatism addresses the interactions between human beings and environments (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2012). Different beliefs can lead to actions, and different actions can in turn lead to beliefs. It is through a combination of action and reflection that knowledge is generated.

Methodologically, pragmatism combines the use of quantitative and qualitative research methods to address research problems, generate holistic views and inform thoughtful actions

(Johnson & Onwuegbuzie, 2004; Morgan, 2007). The selection of methodologically flexible and reflexive methods plays a crucial role in addressing the research questions of this study, leading to *complementary strengths* of both quantitative and qualitative research:

> Gaining an understanding of the strengths and weaknesses of quantitative and qualitative research puts a researcher in a position to mix or combine strategies.... According to this principle, researchers should collect multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination is likely to result in complementary strengths and nonoverlapping weaknesses (Johnson & Onwuegbuzie, 2004, p. 18).

Most importantly, the interpretative dimension of a pragmatic approach rests upon *the connection between theory and data* as "abduction", which is separate from a theory-driven deduction or a data-driven induction of reasoning (Morgan, 2007). It underpins the rationale for the data analysis, reasoning and interpretation of this study and relates to a hybrid approach of both inductive and deductive coding and theme development to the qualitative data (Fereday & Muir-Cochrane, 2006). It acknowledges the "intersubjectivity" that captures the *duality* of both complete objectivity and subjectivity, and addresses inferences through moving back and forth between induction and deduction. It draws upon the "generality" of a quantitative approach and the "context" of a qualitative approach, and advocates the idea of "transferability" (Morgan, 2007).

Overall, the ontological, epistemological and methodological assumptions of pragmatism are in line with the use of a mixed methods approach to exploring teachers' collaborative reflective enquiry practices in this study. Pragmatism is more appropriate than other philosophical approaches in directly addressing the research questions and combining the advantages of quantitative and qualitative methods. Hence, a teacher survey was used to investigate the nature and extent of rural Chinese teachers' collaborative reflective enquiry, PLCs and professional development practices in the first phase for an overview. This was primarily complemented by semi-structured interviews in the second phase, which explored rural Chinese teachers' views of the concept, typical features and perceived benefits of collaborative reflective enquiry as well as the challenges and strategies for their collaborative reflective enquiry practices.

Initially, interpretivism was considered due to its core argument that knowledge is socially constructed and needs to be interpreted in a particular social context (Lather, 2006). Interpretivism focuses on meaning making and is in line with the context specificity of collaborative reflective enquiry. However, interpretivism has not had a strong focus on problem-solving and may not reflect sufficiently the *approach-focused* nature of this study, especially in relation to the RQ3 of this study on the strategies that could improve teachers' collaborative reflective enquiry practices in rural Sichuan Province, China. Also, interpretivism supports subjectivity (Lather, 2006) and may not demonstrate the relatively objective behaviour patterns captured by quantitative methods such as large-scale surveys. Therefore, interpretivism was not suitable for underpinning the sequential mixed methods research design of this study.

4.3 Research Design and Methodology

A *sequential* mixed methods research design (Quan + QUAL)[10] was employed in this study to address research questions (Creswell, 2009; Greene, 2008; Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2006, 2012). A quantitative approach was used in the first phase to outline an overview of teachers' professional development, PLCs and especially collaborative reflective enquiry practices, focusing on the breadth. This was complemented by a qualitative approach to exploring the depth of teachers' views on their collaborative reflective enquiry practices in the second phase. This mixed methods approach was used in this study to combine "measurement" and "interpretation" (Teddlie & Tashakkori, 2012). It adopts a workable definition of mixed methods as follows:

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g. use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Johnson et al., 2007, p. 123).

[10] Please note that this is not a concurrent mixed methods research design, and the quantitative and qualitative approaches don't share the same status, due to the scope and time duration of this study. The qualitative approach is relatively more dominant. For details please see Johnson and Onwuegbuzie (2004, p. 22).

This definition is summarised based on content analysis of 19 different definitions in the literature (Johnson et al., 2007). It highlights one key characteristic of mixed methods research that relates to "methodological eclecticism" (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2012). This mixed methods approach rests upon a way of mixed methods thinking as follows:

> A mixed methods way of thinking is an orientation toward social inquiry that actively invites us to participate in dialogue about multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important and to be valued and cherished (Greene, 2008, p. 20).

Crucially, the rationale for integrating both quantitative and qualitative approaches in this study built upon the key purpose of "complementarity" proposed by Greene et al. (1989), alongside some considerations in expansion and development.

Table 7. Rationale for Mixed Methods Approach

Purpose	**Rationale**
Complementarity	**To seek elaboration, enhancement and/or illustration of the results**
Expansion	To seek the breadth and range of inquiry by using different methods for different inquiry components
Development	To seek to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions

Greene et al. (1989, p. 259)

Note that the key rationale of complementarity for this study is highlighted in bold.

The depth of the qualitative findings on rural Chinese teachers' collaborative reflective enquiry practices was used to *complement* the breadth of the quantitative findings (Greene et al., 1989; Johnson & Onwuegbuzie, 2004; Teddlie et al., 2006). A similar sequential methodological approach has been included in the VITAE project as part of the methodological synergy which combined elements of both sequential and concurrent mixed methods approaches (Day et al., 2006). This approach can be also found in other mixed methods studies related to teacher professional development, PLCs and collaborative reflective enquiry (DeLuca et al., 2017; Gu & Li, 2013; D. Huffman & Kalnin, 2003; Prenger et al., 2019; Thomas & Peng, 2014). Consequently, this sequential mixed methods research design was employed in this study.

4.4 Research Methods

In terms of methods, a teacher survey was conducted in the first phase, which was complemented by semi-structured interviews in the second phase. The selection of these two methods was due to the flexibility of both survey and interviewing, their alignment with pragmatism, and the strengths of being time-saving and cost-effective. The strength of the depth reflected in the interview data added to that of the breadth demonstrated through the survey data. Hence, the research methods of teacher survey and semi-structured interviews were combined to provide the best approach to directly address the research questions within the scope of PhD research. Moreover, the choice of teacher survey and semi-structured interviews was evidenced by the review findings of mixed methods research that survey research and semi-structured interviews are the predominant methods used in existing mixed methods research (Bryman, 2006). This is partly because survey research is typically used to examine variations and relationships of key constructs, and interviewing has the flexibility in its alignment with different paradigms. Also, other qualitative methods such as narrative enquiry and ethnography may align with a particular non-positivist paradigm and focus primarily on the lived experiences of research participants. It may be challenging to combine these qualitative methods with the survey research that aligns with a positivist or post-positivist paradigm. Hence, the combination of survey research and interviewing has been most commonly used in mixed methods research.

More specifically, a teacher survey was conducted to investigate the nature and extent of rural Chinese teachers' professional development, PLCs and collaborative reflective enquiry practices, thereby addressing RQ1. The teacher survey was chosen for its possibility of producing quantitative numerical systematic descriptions of the data and showcasing the breadth of the data based on frequencies, trends and patterns (Desimone, 2009). Survey data is by nature broad, and has been examined with good validity and reliability for research regarding the behavioural and descriptive questions of teacher professional development (Desimone, 2009). Survey research is also time-saving, cost-effective and feasible, particularly in the light of the limited timeframe and scope for a doctoral research study.

In order to address RQ2, follow-up semi-structured interviews were conducted to investigate rural Chinese teachers' views of the concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices. Interviewing is a special form of conversational practice between the interviewer and the interviewee, and involves the researcher's inductive interpretations in a socially constructed setting (Kvale & Brinkmann, 2007). It can capture the depth of the data and has been widely used in qualitative research (Lincoln, Lynham, & Guba, 2011). Interviewing has the flexibility of being interpreted within different research paradigms, and has been used as a practical method prior to the discussion of research paradigms (Kvale & Brinkmann, 2007). The strengths of interviewing in exploring teacher professional development can be illustrated as follows:

> "interviews…are also appropriate for providing narratives, examples, and anecdotes to answer research questions directed at questioning models of teacher interactions; generating hypotheses; and describing and understanding the complexities of professional development in a specific context, how beliefs and attitudes change, and the processes through which teachers change their instruction" (Desimone, 2009, p. 190).

In particular, semi-structured interviewing was selected in this study for its flexibility in obtaining data that is pertinent to research questions, being less structured (Bryman, Becker, & Sempik, 2008).It can generate richness of data by opening up the possibility both for the interviewer to ask follow-up questions and for the interviewee to respond in depth to research questions (Bryman et al., 2008).

4.5 Development of Research Instruments

The research instruments of both teacher questionnaire and interview schedule were designed to investigate collaborative reflective enquiry, drawing on key concepts and items/scales employed in previous research (Butler & Schnellert, 2012; Desimone, 2009; J. Nelson et al., 2017; OECD, 2013; The Ontario Ministry of Education, 2010; The Welsh Government, 2015; Timperley et al., 2007). The teacher questionnaire was used to measure the key aspects of professional development, the concept of PCLs and, most importantly, the three elements of collaborative reflective enquiry relating to collaboration, use of research

and evidence and reflection. The interview schedule was informed by the conceptual framework outlined in Chapter 3 Literature Review to investigate specifically rural Chinese teachers' views of the concept, typical features, perceived benefits of collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices.

4.5.1 Teacher Questionnaire

The development of the teacher questionnaire drew upon previous research instruments with similar themes relating to teacher professional development, PLCs and collaborative reflective enquiry (collaboration, use of research and evidence, and reflection). For instance, items on "teacher professional development" were extracted from the OECD TALIS 2008 (OECD, 2013). Items and five predefined scales of "PLCs" were replicated from the OECD TALIS 2013 (OECD, 2016b). Items relating to "collaborative reflective enquiry" were adapted from two sources of the OECD TALIS 2013 and the Welsh Government survey on reflective practice (The Welsh Government, 2015). Three scales of collaborative reflective enquiry regarding collaboration, use of research and evidence and reflection were created via factor analysis. The "collaboration" element of collaborative reflective enquiry was measured using the items of OECD TALIS 2013, and the elements of "use of research and evidence" and "reflection" were adapted from the Welsh Government survey. In addition, items and five predefined scales of "research engagement" were replicated from the research use survey co-developed by the NFER and EEF in the UK to measure teachers' research engagement for supplementary information on teachers' use of research and evidence (J. Nelson et al., 2017). All items of the teacher questionnaire were used to address RQ1 regarding the nature and extent of rural Chinese teachers' engagement in professional development, PLCs and collaborative reflective enquiry practices.

4.5.1.1 Items Extracted from the OECD TALIS 2008 Survey regarding Teacher Professional Development

Seven items regarding teacher professional development in this study were extracted from the TALIS 2008 to measure teachers' participation in professional development and its impact (OECD, 2009).

Table 8. Aspects of Teacher Professional Development

Teacher Professional Development - Participation	**Response Categories**	**Teacher Professional Development - Impact**	**Response Categories**
8.1.1 Courses/workshops	Yes/No	8.2.1 Courses/workshops	Four-point scale *(No impact, a small impact, a moderate impact, a large impact)*
8.1.2 Education conferences or seminars		8.2.2 Education conferences or seminars	
8.1.3 Qualification programme		8.2.3 Qualification programme	
8.1.4 Observation visits to other schools		8.2.4 Observation visits to other schools	
8.1.5 Participation in a network of teachers		8.2.5 Participation in a network of teachers	
8.1.6 Individual or collaborative research		8.2.6 Individual or collaborative research	
8.1.7 Mentoring and coaching		8.2.7 Mentoring and coaching	

(OECD, 2009)

The participation was measured by different types of professional development activities relating to "course/workshops, education conferences or seminars, qualification programme, observation visits to other schools, participation in a network of teachers, individual or collaborative research, and mentoring and/or peer observation and coaching". The impact of professional development was measured by four response categories of "no impact, a small impact, a moderate impact and a large impact". The selection of the OECD survey instrument on teacher professional development was due to its high reliability and validity across countries and economies, including Shanghai-China (OECD, 2013, 2016b). The research findings of this study were used for a comparison to those of the ITDEQC project within which the same items were used for teachers' participation in professional development and the subsequent impact.

4.5.1.2 Items Extracted from the OECD TALIS 2013 Survey regarding PLCs

The PLCs items in this study were replicated from the TALIS 2013, consisting of five predefined scales regarding "deprivatised practice", "collective focus on student learning", "reflective dialogue", "collaborative activity" and "shared sense of purpose" (OECD, 2016b). These five scales have also been used in China to measure PLCs (X. Zheng et al., 2019).

Table 9. Measurement of PLCs

PLCs Scales	**Definition**	**Items**	**Response Categories**
Deprivatised practice	Teachers observe other teachers' classes, with the goal of providing feedback on their teaching	10.1 Feedback following direct observation of your classroom teaching; 10.2 Feedback from student surveys about your teaching; 10.3 Feedback following an assessment of your content knowledge; 10.4 Feedback following an analysis of your students' test scores;	Yes/No

		10.5 Feedback following your self-assessment of your work; 10.6 Feedback following surveys or discussions with parents or guardians	
Collective focus on student learning	The extent to which student performance is emphasised within a school	11.1 Student performance; 11.2 Knowledge and understanding of my subject fields; 11.3 Pedagogical competencies in teaching my subject fields; 11.4 Student assessment practices; 11.5 Student behaviour and classroom management	Four-point scale *(Not considered at all, considered with low importance, considered with moderate importance, considered with high importance)*
Reflective dialogue	The extent to which teachers are engaged in professional conversations about specific educational issues	12.1 Your classroom management practices; 12.2 Your knowledge and understanding of your main subject fields; 12.3 Your teaching practices; 12.4 Your methods for teaching students with special needs; 12.5 Your use of student assessment to improve student learning	Four-point scale *(No positive change, a small change, a moderate change, a large change)*
Collaborative activity	The exchange and co-ordination of teaching	13.1 Exchange teaching materials with colleagues; 13.2 Engage in discussions about the learning development of specific students; 13.3 Work with other teachers in my school to ensure common standards in evaluations; 13.4 Attend team conferences	Six-point scale *(Never, once a year or less, 2-4 times a year, 5-10 times a year, 1-3 times a month, once a week or more)*
Shared sense of purpose	Teachers' agreement on school mission and its operational principles	14.1 This school has a culture of shared responsibility for school issues; 14.2 There is a collaborative school culture which is characterised by mutual support	Four-point scale *(Strongly disagree, disagree, agree, strongly agree)*

(OECD, 2016b, p. 91)

The scale of "deprivatised practice" comprised six items regarding teachers' classroom observations, with the goal of providing feedback on their teaching. It was used to measure whether teachers received feedback from other teachers following direct observation of their classroom teaching, from student surveys about their teaching, following an assessment of their content knowledge, following an analysis of their students' test scores, following their self-assessment of their work (e.g. presentation of a portfolio assessment), and following surveys of discussions with parents or guardians.

The scale of "collective focus on student learning" was measured by teachers' emphasis on student performance, together with four related aspects of knowledge and understanding of teachers' subject field, pedagogical competencies in teaching subject field, student assessment practices, and student behaviour and classroom management. This scale was measured by four response categories of "not considered at all, and considered with low, moderate and high importance".

The scale of “reflective dialogue” consisted of five items in relation to the extent to which teachers were engaged in professional conversations about specific educational issues. The issues were related to five aspects of classroom management practices, knowledge and understanding of their main subject field, teaching practices, methods for teaching students with special needs, and use of student assessments to improve student learning. This scale was measured by four response categories of “no positive change, a small change, a moderate change, and a large change”.

The scale of “collaborative activity” comprised four items of exchanging teaching materials with colleagues, engaging in discussions about the learning development of specific students, working with other teachers in their school to ensure common standards in evaluations for assessing student progress, and attending team conferences. This scale was measured by six response categories of “never, once a year or less, 2-4 times a year, 5-10 times a year, 1-3 times a month, and once a week or more”.

The scale of “shared sense of purpose” was measured by two items associated with whether the school had a culture of shared responsibility for school issues, and whether there was a collaborative school culture which was characterised by mutual support. This scale was measured by four response categories of “strongly disagree, disagree, agree and strongly agree”. Similar to teacher professional development mentioned above, the OECD survey instrument on PLCs has been validated internationally and has high reliability and validity (OECD, 2013, 2016b). The findings were used to be compared to those of TALIS 2013 Shanghai-China.

4.5.1.3 Items Extracted from the OECD TALIS 2013 and the Reflective Practice Survey of the Welsh Government regarding Collaborative Reflective Enquiry

The key focus of this study on collaborative reflective enquiry was measured in this study, using the three key elements of collaboration, use of research and evidence, and reflection[11] (OECD, 2016b; The Welsh Government, 2015).

Table 10. Elements of Collaborative Reflective Enquiry

Elements of Collaborative Reflective Enquiry	**References**	**Definition**	**Items**	**Response Categories**
Collaboration	(OECD, 2016b)	The exchange and co-ordination of teaching	13.1 Exchange teaching materials with colleagues; 13.2 Engage in discussions about the learning development of specific students; 13.3 Work with other teachers in my school to ensure common standards in evaluations; 13.4 Attend team conferences	Six-point scale *(Never, once a year or less, 2-4 times a year, 5-10 times a year, 1-3 times a month, once a week or more)*
Reflection	(The Welsh Government, 2015)	The extent to which teachers reflect on teaching and learning	9.1 How often do you evaluate your lessons? 9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened? 9.3 How often do you modify your lessons as a result of reflection? 9.4 How often do you talk to a colleague about learning and teaching? 9.5 How often do you apply wise suggestions to improve your practice? 9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons? 9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	
Use of research and evidence	(The Welsh Government, 2015)	The extent to which teachers use research and evidence to enquire about student learning	9.9 How often do you read relevant research literature? 9.10 How often do you compare different sources of evidence when deciding what actions to take? 9.11 How often do you undertake action research as a result of reflecting upon learning and teaching? 9.12 How often do you evaluate your professional development activities, such as attending courses? 9.13 How often do you incorporate ideas from professional development activities into your practice? 9.6 How often do you 'look outside' the school for inspiration?	

[11] For technical details of factor analysis on collaborative reflective enquiry, please see Appendix 6. The dimension of collaboration in this study appears to have internal consistency, α=.83, with the dimensions of use of evidence and research, α=.85. and reflection, α=.90.

The element of “collaboration” was measured by the same four items of the PLCs collaborative activity in relation to “exchanging teaching materials with colleagues, engaging in discussions about the learning development of specific students, working with other teachers in their school to ensure common standards in evaluations for assessing student progress, and attending team conferences” (OECD, 2013).

The element of “reflection” was measured by seven items relating to the extent to which teachers evaluated their lessons, thought about ‘why’ and ‘so what’ as well as what happened in evaluations, modified their lessons as a result of reflection, talked to a colleague about learning and teaching, applied wise suggestions to improve their practice, listened and acted upon the views of others when reflecting on how to improve lessons, and discussed about how to improve the quality of learning and teaching in team/staff meetings.

The element of “use of research and evidence” was measured by six items regarding the extent to which teachers read relevant research literature, compared different sources of evidence when deciding what actions to take, undertook action research as a result of reflecting upon learning and teaching, evaluated their professional development activities, incorporated ideas from professional development activities into your practice, and looked outside the school for inspiration.

All three elements of collaborative reflective enquiry were measured by the same six response categories of “never, once a year or less, 2-4 times a year, 5-10 times a year, 1-3 times a month, and once a week or more”. These three elements were adapted from the survey instruments of TALIS 2013 and the Welsh Government as baseline research to examine rural Chinese teachers’ engagement in their collaborative reflective enquiry practices. The findings were used to yield new empirical evidence to add to the knowledge base of collaborative reflective enquiry both in China and internationally.

4.5.1.4 Items Extracted from the EEF-NFER Research Use Survey regarding Research Engagement

The items regarding research engagement were replicated from the EEF-NFER research use survey for supplementary information relating to teachers' use of research and evidence (J. Nelson et al., 2017). Five predefined scales were used regarding "positive disposition to academic research in informing teaching practice", "use of academic research to inform selection of teaching approaches", "perception that academic research is not useful to teaching", "perception that own school does not encourage use of academic research", and "active engagement with online evidence platforms".

Table 11. Measurement of Research Engagement

Scales of Research Engagement	**Response Categories**
Positive disposition to academic research in informing teaching practice	Depends on the questions (see Appendix 10)
Use of academic research to inform selection of teaching approaches	
Perception that academic research is not useful to teaching	
Perception that own school does not encourage use of academic research	
Active engagement with online evidence platforms	

(J. Nelson et al., 2017)

The scale of "positive disposition to academic research in informing teaching practice" was measured by how easy teachers found understanding academic research, whether information from research played an important role in informing teaching practice, whether teachers knew where to find relevant research that may help to inform teaching methods/practice, whether teachers were able to relate information from research to their context, whether teachers felt confident about analysing information from research, and whether teachers used information from research to help them to decide how to implement new approaches in the classroom.

The scale of "use of academic research to inform selection of teaching approaches" was measured by whether academic research was important in identifying a specific approach and teachers used CPD based on academic research, the extent to which the decision to adopt an approach was due to it being based on academic research, and the extent to which teachers consulted academic research.

The scale of “perception that academic research is not useful to teaching” was measured by the attitudes that teachers did not believe that using information from research would help to improve pupil outcomes and that the information from research conducted elsewhere was of limited value to their school.

The scale of “perception that own school does not encourage use of academic research” was measured by the fact that their school leaders/governors did not encourage them to use information from research to improve their practice, and that other staff in their school rarely used information from research to inform their teaching practice.

The scale of “active engagement with online evidence platforms” was measured by the extent to which teachers consulted online platforms and by how easy they found understanding online platforms.

The NFER-EEF research use survey has been designed as a piece of baseline survey research to capture teachers’ research engagement and evidence use in English schools. The survey instrument has been validated across different EEF-funded research projects. It was therefore replicated and adapted in this study for rural Chinese teachers’ baseline views of their research engagement. The findings were used to yield new empirical evidence on teachers’ research engagement in China.

Overall, the questionnaire was piloted with 30 teachers prior to survey data collection. The questionnaires were administered electronically to the 30 teachers for piloting, and were completed voluntarily and anonymously. The short summary of initial questionnaire findings suggested that there was an adequate spread of responses from pilot teachers, and yet a need for changing some response categories to make the analysis and presentation better aligned and easier for the reader to follow (e.g. use the same response scales). Confusing items were dropped from the initial version. A final version of the questionnaire was created (see Appendix 4).

4.5.2 Interview Schedule

The design of the interview schedule was informed by the conceptual framework of collaborative reflective enquiry (see Chapter 3 Literature Review). The questions of the interview schedule were designed to address RQs 2 and 3 relating to the concept, typical features and perceived benefits of collaborative reflective enquiry as well as the challenges and strategies for rural Chinese teachers' collaborative reflective enquiry practices.

Table 12. Interview Questions Related to the Key Aspects of Collaborative Reflective Enquiry

Key aspects of collaborative reflective enquiry	**Key interview questions**
Collaboration	How do you or other teachers or both in your school work collaboratively with each other? Could you please give me some examples?
Use of research and evidence	To what extent do you or other teachers or both regularly and consistently analyse what and how students are learning? How do you use evidence? Both research evidence and non-research evidence? Have you undertaken any research projects?
Reflection	Do you think you or other teachers are reflective? On what aspect? Could you please give me some examples?
Concept/Definition	What does the term "enquiry" mean to you? Can you provide an example to illustrate this? How about collaborative reflective enquiry?
Typical features	Could you please give me some examples of collaborative reflective enquiry practices in your school? How do you usually do that?
Perceived benefits	In terms of effective enquiry practices in your school, what are the benefits for teachers and students?
Challenges	What are the main challenges? Could you please give me some examples?
Strategies	What are the strategies that could enhance teachers' collaborative reflective enquiry practices in your school? What conditions/support do you need from the school, leadership teams and LEAs to enhance your collaborative enquiry practices for development and learning?

The schedule started with relatively broad stimulating questions about teacher professional development and then directed teachers' attention to the key elements of collaboration, use of research and evidence, and reflection, which were informed by the conceptual framework of collaborative reflective enquiry. Subsequently, the interview schedule focused specifically on the views of rural Chinese teachers on the concept, typical features, and perceived benefits of collaborative reflective enquiry, and the challenges and strategies for their collaborative reflective enquiry practices.

The interview questions were piloted with two local teachers to ensure that all questions were clear, and easy for participants to understand. The pilot interviews were conducted through telephone calls and were recorded with the consent of the two interviewees. The pilot interviews lasted for approximately one hour per interview. Suggestions were given by the interviewees on refining the wording of the questions.

4.6 Data Sampling

The strategy of "sequential mixed methods sampling" (Teddlie & Yu, 2007) was employed in this study, with the quantitative phase used as the sampling frame for the subsequent qualitative phase. This is typically used in mixed methods sampling (Teddlie & Yu, 2007). Also, the strategy of "convenience sampling" (Onwuegbuzie & Collins, 2007) was used to sample three secondary schools[12] that were conveniently available in Sichuan Province, China. The convenience sampling was defined as "choosing settings, groups, and/or individuals that are conveniently available and willing to participate in the study" (Onwuegbuzie & Collins, 2007, p. 286). It was considered and employed primarily on the basis of access in this study. Overall, a teacher survey was administered to a random sample of 500 teachers in these three schools, and 355 teachers responded. The response rate was 71% (355 out of 500 questionnaires), with 62.5% of School A (125 out of 200), 68% of School B (136 out of 200) and 94% of School C (94 out of 100) respectively. Out of these 355 teachers for the survey, 14 teachers volunteered to participate in the follow-up interviews.

Three state schools were sampled in this study in one geographic area, with different locations and academic performance. Schools A, B and C are in small town, town and county respectively. According to the league table, School C outperformed School B academically, and School B outperformed School A. Overall, there are 130 teachers and 2100 students in School A, and 220 teachers and 2700 students in School B. There are around 400 teachers and 3000 students in School C.

Table 13. Sampling Criteria for Schools

School	Academic performance	Number of teachers	Number of students
A	Low achieving	130	2100
B	Average	220	2700
C	High achieving	400	3000

[12] Three secondary schools with 2 County-level and 1 township-level schools in rural Sichuan were conveniently available for this study.

The paper questionnaires were administrated by school coordinators in the three schools, and distributed randomly to teachers when they gathered for Teaching and Research Groups Meetings. Issues of volunteer participation, anonymity and confidentiality were explained by the researcher in person. The completed paper questionnaires were returned to the school coordinators and passed onto the researcher, with the help of Heads of Teaching and Research Groups.

14 teachers of different gender, age and subjects volunteered to participate in the interviews. These teachers indicated their willingness to take part in the interviews on the questionnaire by leaving their contact details. There are 5 teachers in School A, 5 teachers in School B and 4 teachers in School C.

Table 14. Sampling Criteria for Teachers

School	Teacher	Job title	Gender	Age	Subject
A	1	First Grade	Female	45	History
A	2	First Grade	Female	45	Chemistry
A	3	Senior	Female	45	English
A	4	Second Grade	Female	29	Geography
A	5	First Grade	Male	34	Maths
B	1	Zheng Senior	Male	51	ICT
B	2	Senior	Female	40	English
B	3	First Grade	Male	38	Chinese
B	4	First Grade	Female	33	Maths
B	5	Second Grade	Female	24	Music
C	1	Senior	Male	49	Chinese
C	2	Senior	Male	41	Maths
C	3	Second Grade	Male	37	Biology
C	4	Senior	Male	57	English

The interviews were conducted by the researcher via mobile phones. The interviews were all recorded by the researcher using professional recorders. Informed consent was gained from all teacher interviewees. The interviewees had the right to withdraw from the research at any time (see further details in Appendix 3).

4.7 Data Collection

The data of this study was collected through two different stages (quantitative and qualitative stages) within a timeframe between November 2017 and August 2018. The preliminary analysis of data collected from the teacher survey contributed to the development of interview schedule and follow-up interviews. The data was collected by the researcher as follows:

Table 15. Methods of Data Collection

Method	Sample	Timeframe	Venue
Teacher survey	355 teachers in 3 schools	November and December 2017	Sichuan Province, Southwest China
Semi-structured interviews	14 teachers (out of 355) in 3 schools	July and August 2018	Telephone

4.7.1 Quantitative Data Collection

The survey data was collected by the researcher in person in November and December 2017. The questionnaires were administered on paper, based on the advice from local school coordinators that teachers preferred completing paper questionnaires and might not have suitable access for an online survey. Therefore, hard-copy questionnaires were prepared by the researcher and distributed by school coordinators to 500 teachers across three schools. The teachers completed the questionnaires during their Teaching and Research Groups activities, in which the surveyed teachers gathered together as groups. Prior to the completion of the questionnaires, issues of anonymity, confidentiality and voluntary participation (written on the survey) were explained. The informed consent of survey participants would be indicated once teachers chose to complete the survey. Upon completion, the questionnaires with concealed information were returned to the school coordinators and then handed over to the researcher. All personal information was kept confidentially throughout the process.

4.7.2 Qualitative Data Collection

The interview data was collected by the researcher through telephone calls in July and August 2018. Preparation notes were sent to interviewees regarding the length of interviews (one

hour per interview), and the final checks of WIFI, battery and interview environment. A sheet of information and informed consent was sent to interviewees for their signatures to gain interviewees' informed consent prior to each one of the interviews. Teachers were informed of the aim of the study as well as the issues of confidentiality and anonymity at the beginning of the interviews. Semi-structured interviews were conducted by the researcher. All conversations were recorded throughout the interviews. The interview schedule was employed in each one of one-hour interviews to ensure that key aspects of interview questions relating to collaborative reflective enquiry were covered. Overall, the interview style was conversational and interactive.

4.8 Data Analysis

Both quantitative and qualitative data was analysed, using SPSS software and thematic analysis. SPSS software (Field, 2013) was used to calculate the predefined scales where applicable and analyse the survey item and scale frequencies, means, standard deviations of the quantitative data. Two-way ANOVA analyses were conducted to test the interaction effect of "school" and "teacher experience" on the survey items and scales, and compare mean differences of school and teacher experience groups using post-hoc tests[13]. Such parametric statistical tests have more statistic power than nonparametric tests in detecting a difference (Chin & Lee, 2008; Sheskin, 2004). Thematic analysis was used to analyse the findings of the interview data, due to its flexibility and organic approach (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006). Overall, both the quantitative and qualitative data was analysed to address all three research questions as follows:

Table 16. Methods of Data Analysis

Step	Survey analysis	Research question
1	*Descriptive statistics*: Frequencies, means and standard deviations of teachers' responses to questionnaire items	RQ1 To what extent do teachers in three secondary schools of rural Sichuan Province, China report engagement in professional development, PLCs and collaborative reflective enquiry? Are there any differences in teachers' responses according to factors of school and teacher experience?
2	*Two-way ANOVA analysis*: Two-way ANOVA for each item to test the interaction effect of "school" and "teacher experience", and compare mean differences of school and teacher experience groups using post-hoc tests	

[13] One-way ANOVA by school (Schools A, B and C) and experience (less than 4 years, 5-19 years, and 20 years or more) was similarly analysed for individual items to investigate whether the findings contradicted with those of two-way ANOVA. The results of one-way ANOVA were identified to be very similar to those of two-way ANOVA. For details about the one-way ANOVA results, please see Appendix 8.

	Interview analysis	
3	*Thematic analysis*: Teacher views of the concept, typical features, perceived benefits, and challenges	RQ2 What are the views of teachers in three secondary schools of rural Sichuan Province, China on the concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges for their collaborative reflective enquiry practices?
4	*Thematic analysis*: Teachers' views of the strategies	RQ3 What are the views of teachers in three secondary schools of rural Sichuan Province, China on the strategies that could improve their collaborative reflective enquiry practices?

4.8.1 Survey Analysis

SPSS software was used throughout the process of survey analysis. The survey analysis was conducted to address RQ1. Descriptive statistics such as frequencies, means and standard deviations of responses to each questionnaire item was used to demonstrate the extent of teachers' engagement in professional development, PLCs and collaborative reflective enquiry practices in rural Sichuan Province, China. A similar approach to survey analysis was used in the study of Thomas, Smees, MacBeath, Robertson, and Boyd (2000) to examine the range and variations of means and standard deviations. The results were used to identify the general pattern of teachers' responses towards questionnaire items broadly. Tables of descriptive statistics were produced based on analysis through SPSS (Field, 2013). Given that some item response categories in the tables were found to be much less reported, changes were made by collapsing similar categories in order to obtain a clearer summary of the results. For example, the response categories for experience were collapsed from six groups into three of "Less than 4 years", "5-19 years", and "20 years or more".

A two-way ANOVA by both "school" and "teacher experience" was conducted for individual items to examine whether there was a statistically significant interaction effect of "school" and "teacher experience" on these items, and to compare mean differences of school and teacher experience groups using post-hoc tests. The selection of these two factors was based on the findings of previous research that both factors could potentially affect teachers' professional development and PLCs practices in China (Thomas et al., 2018; D. Wang et al., 2017). Equivalent analyses were conducted for the scales that were used to measure teacher

professional development, PLCs and collaborative reflective enquiry to investigate whether the findings of scales contradicted with those of individual items.

4.8.2 Interview Analysis

Thematic analysis (Braun & Clarke, 2006) was used to analyse and interpret the interview data in order to investigate rural Chinese teachers' views of the concept, typical features and perceived benefits of collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices. In particular, a hybrid approach of inductive and deductive coding and theme development to thematic analysis was used (Fereday & Muir-Cochrane, 2006). The analysis built upon the concept of thematic analysis as "a method for identifying, analysing and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 79). It was based on an "organic" approach to coding and theme development, and emphasised the active role of the researcher in analysis processes. It has been argued that thematic analysis has the "flexibility" to distinguish itself from other qualitative analytic approaches, and is not tied to a particular ontological or epistemological assumption:

> "The hallmark of this form of TA is its flexibility – not simply theoretical flexibility, but flexibility in terms of research question, sample size and constitution, data collection method, and approaches to meaning generation. TA can be used to identify patterns within and across data in relation to participants' lived experience, views and perspectives, and behaviour and practices; 'experiential' research which seeks to understand what participants think, feel, and do". (Clarke & Braun, 2016, p. 297)

In order to inform and guide the thematic analysis of this study, an analytical framework for collaborative reflective enquiry that comprised the aspects of characteristics, processes and perceived benefits was created based on previous research (Butler & Schnellert, 2012; The Ontario Ministry of Education, 2010; Timperley et al., 2007). The characteristics of collaborative reflective enquiry were related to enquiry being "relevant, collaborative, reflective, iterative, reasoned, adaptive and reciprocal" (The Ontario Ministry of Education, 2010). The enquiry processes of collaborative reflective enquiry were characterised by a circle of enquiry regarding students learning needs, teachers learning needs, design of tasks and experiences, teaching actions and the impact of changed actions (Timperley et al., 2007). The perceived benefits of collaborative reflective enquiry could be discussed at teacher and

student levels (Butler & Schnellert, 2012). Overall, this framework was used to develop codes and themes of the interview data regarding collaborative reflective enquiry, and to explore whether previous or new codes may emerge from the data.

The analysis of this study involved a constant recursive process, moving back and forth across all transcriptions through six processes (Braun & Clarke, 2006). The processes included getting familiarised with data, generating initial codes drawn from the data collected as well as previous research, searching for themes, reviewing themes, defining and naming themes and presenting the findings (Braun & Clarke, 2006). Prior to the above thematic analysis processes, verbal data was transcribed into written texts in Mandarin Chinese and then translated into English, which allowed the researcher to familiarise himself with the data in the beginning. The first phase of the analysis involved the researcher's full immersion in the data through repeated reading for the depth of the content. Important notes were taken and interesting ideas were marked. The second phase included production of initial codes by working systematically across the entire data set and identifying key aspects that could inform the basis of broader themes relating to collaborative reflective enquiry. Key features of the data were extracted into initial codes. On the basis of initial codes, overarching themes (e.g. teaching and curriculum, and formal and informal collaboration) were then analysed in the third phase. In the fourth phase of the analysis, all the codes and theme-piles were reviewed to search for a coherent pattern related to the concept, typical features, perceived benefits of collaborative reflective enquiry and its challenges and strategies. The pattern was reviewed further to explore whether accurate representation was reflected across all the data. In the next phase of the analysis, illustrative key quotes and themes were identified. Finally, the themes were defined, refined, and named to address RQs 2 and 3.

4.9 Validity, Reliability and Trustworthiness

The validity and reliability of this mixed methods study are discussed based on the quality criteria of both quantitative and qualitative research respectively. The rationale underpinning this decision is that assessing the validity and reliability of mixed methods findings is complex (Onwuegbuzie & Johnson, 2006). Relevant assessment frameworks are still developing and likely to be more conceptual and complicated in nature (Dellinger & Leech, 2007; Leech,

Dellinger, Brannagan, & Tanaka, 2010; Onwuegbuzie & Johnson, 2006). For example, a concept of "legitimation" has been proposed by Onwuegbuzie and Johnson (2006) to combine inferences from the quantitative and qualitative components of mixed methods research into the formation of "meta-inferences". It has been argued that the validity of mixed methods research could be assessed through "sample integration, inside-outside, weakness minimisation, sequential, conversion, paradigmatic mixing, commensurability, multiple validities and political". However, these approaches are relatively conceptually broad and likely to step away from the key focus of validity and reliability issues from a more traditional point of view (Onwuegbuzie & Johnson, 2006). Similarly, the "validation framework" proposed by Leech et al. (2010) focuses on five dimensions of "the foundational element", "the elements of construct validation for quantitative, qualitative, and mixed research", "inferential consistency", "the utilisation/historical element", and "the consequential element". Yet, insufficient information is available for researchers to apply this validation framework into practice. Therefore, a decision was made to assess the validity and reliability issues of this mixed methods study on the basis of well-established concepts (Bryman et al., 2008; Creswell & Miller, 2000; Dale, 2006; Lincoln et al., 2011; Onwuegbuzie & Johnson, 2006; Tracy, 2010). The validity issues of the quantitative survey were assessed in terms of validity and reliability, whereas those of the qualitative interviews were discussed with a focus on trustworthiness (Bryman et al., 2008).

4.9.1 Validity and Reliability of the Survey

In terms of the validity and reliability of the survey, empirically validated survey instruments and items/scales were replicated and adapted from published sources to measure the constructs of professional development, PLCs and collaborative reflective enquiry (J. Nelson et al., 2017; OECD, 2009, 2013; The Welsh Government, 2015). The instruments and items/scales developed in previous research have high validity and reliability and have been employed in this study to enhance the validity and reliability of the survey findings. Efforts were made to ensure the consistency of the wording and response categories of survey items across constructs. Complicated wording and items were deleted on the basis of piloting results to simplify the questionnaire. Also, a reasonably large number of questionnaires were collected for this small-scale exploratory mixed methods study, with a response rate of 71%

(355 out of 500 questionnaires), although an even bigger sample would have been preferable. The survey was administered by the researcher in person, strictly following the standards of academic ethics, conventions and research procedures at the University of Bristol (UoB). Data analysis was rigorously conducted according to two-way ANOVA to test the interaction effect of "school" and "teacher experience", and compare mean differences of school and teacher experience groups. Transparency of survey analysis was ensured to allow replication, following the framework of Dale (2006) .

Table 17. Framework for Survey Replication

Framework	**Details**
Data source	First hand empirical data
Methods of sampling	Convenience sampling
Mode of data collection	Survey research on paper, in person
Response rates	71% (355 out of 500 questionnaires)
Details of variables used in the analysis	School, teacher experience (see Appendix 7 for summary of raw data, Appendices 8 and 9 for two-way (and one-way) ANOVA results by both items and scales)
A discussion of results that indicates the strength of explanation	Yes

4.9.2 Trustworthiness of the Interviews

The interview questions were informed and designed based on a critical review of three strands of literature relating to teacher professional development, PLCs and collaborative reflective enquiry. The review findings have indicated a gap in the literature regarding the lack of conceptual and empirical research on collaborative reflective enquiry in China. Hence, substantive international and local research evidence was used to shape the scope of the interviewing in order to address these gaps. The interviews were conducted through telephone calls, and recorded by the researcher with the permission and consent of the interviewees. A pre-designed interview schedule was prepared for covering the key aspects of collaborative reflective enquiry. Attempts were made to ensure the clarity and interaction of the interview processes. The interview data was analysed strictly following the thematic analysis processes as outlined in 4.8.2 Interview Analysis. The trustworthiness of the interview findings was improved through double-checking the responses with the interviewees (Creswell & Miller, 2000; Lincoln et al., 2011).

4.10 Ethical Issues

Thoughtful considerations were given to ethical issues that may arise throughout the research study, following the BERA "Ethical Guidelines for Educational Research" (BERA, 2011) and the required UoB guidance and ethical procedure (see Appendix 3). For instance, in terms of access to selected schools, permission was obtained from the local education authority and school heads to keep schools and teachers informed. The access to the voluntary participants of this study was gained, with the support of school "gatekeepers" (Heath, Charles, Crow, & Wiles, 2007). With regard to information given to survey participants, explicit statements of the informed consent (Wiles, Heath, Crow, & Charles, 2005) were provided at the beginning of the paper questionnaires to keep the participants informed (see Appendix 4). Informed consent was indicated upon the completion of the survey. An interview schedule detailing the purpose of, and the time and procedure needed for the interviews was given to the participants prior to interviews. Consent forms for the interviews were sent to interviewees to obtain their consent and signatures. It was stated clearly in the interview consent forms that the voluntary participants had the right to withdraw from the study at any time.

Participants were aware that they had the right to complain about any issues that may arise from their participation in the study through the UoB Ethics Committee. Special attention was given to the well-being of the participants. Respect was shown for participants' individual values and sense of privacy. Issues of anonymity and confidentiality were raised and discussed with research participants prior to their participation (Wiles et al., 2005). It was explained that no identifiable information relating to schools and participants would be made public. Efforts were made to maintain confidentiality of data/records. All possible efforts were made to anonymise individuals and/or places in the dissemination of the study to protect their identity (Wiles et al., 2005). The questionnaires were completed voluntarily, and the interviews were conducted without causing any discomfort. All the data collected was coded and transcribed by the researcher. The data was stored in the University personal computers, and password protected, in line with the UK Data Protection Act.

Also, attention was given to the power dynamics that may have arisen in the process of data collection (Kvale & Brinkmann, 2007). The importance of *voluntary participation* for the

authenticity of the data was emphasised in the survey instructions and to teachers and school leaders. Efforts were made to avoid the influence of administrative power on teachers' completion of the survey, when teachers were asked to complete the questionnaire by the researcher, with the help of school coordinators. Similarly, efforts were also made to establish a more balanced power relationship with the interviewees during the interview process. Attention was given to the "alliance building" with the interviewees (Tanggaard, 2008, 2009). The interviewees were well informed of their potential contribution to this study. Colleague-like interactions and mutual trust were obtained, guided by the principle that "people's willingness to talk to and what people say to you is influenced by who they think you are" (Katyal & King, 2011, p. 336).

4.11 Methodological Limitations

Given that this study has only been conducted by a single researcher over a fixed time period, there are limitations in resources such as the access to participants regarding data sampling. This is because conducting research in a context such as China, including rural China, usually involves some engagement with different gatekeepers (Nordtveit, 2011), and this may vary from one context to another due to the vast landscape and complex contexts of China. This has added to the difficulty in research access. Hence, the total number of schools and teacher participants in this study is relatively limited, thereby to some extent challenging the generalisability of the research findings. For instance, the results based on a convenience sample of over 300 teachers in three schools for the survey research of this study in rural China are, technically speaking, more indicative than generalisable. The views from volunteering teachers within such sample frame have reflected some depth of teachers' understandings of this topic. Further representativeness of the sampling could have been enhanced if more access was granted to other different schools and teachers, with stronger support from the school leadership teams. This limitation has pointed to a need for even more sufficient preparation work for future research prior to the access and sampling of research participants in China. In terms of data collection, the researcher could have been more self-reflective during the process of data collection, in terms of making critical judgements for clarifying key academic terms and guiding the research participants to answer questions more responsively, especially for the interviews.

In terms of data analysis and interpretation, researcher bias may exist. This is because the researcher is familiar with the Chinese ideology and culture as an ethnically Chinese and may sometimes lack self-questioning when analysing and interpreting the data. Thus, this requires an even more self-critical and self-reflexive approach for a balanced positionality to the analysis, reasoning and interpretation of the data, particularly to the interview data. Both insider and outsider perspectives are needed for more objective reasoning, which is of great importance in carrying out educational research in Confucian Heritage culture (Creswell & Miller, 2000; Evers & Mason, 2011; Katyal & King, 2011; Nordtveit, 2011). Therefore, an even more balanced approach, which combines the researchers' insider perspectives as a Chinese and outsider views of a Western-trained "self", is needed to help minimise further the potential bias of the researcher's context-specific reasoning.

Moreover, there are limitations in the development of research instruments regarding both survey instrument and interview protocol. For example, more critical judgements about the choice and use of different surveys could have been made, despite the internationally validated survey instruments that have been replicated and adapted from previous research to this study. Further attention needs to be given to details such as the reliability and validity of scales and the consistency of category responses. Also, the formatting and layout of the teacher questionnaire could have been improved, and important items and/or scales could have been prioritised to avoid missing data. The length of the questionnaire and the time for completion could have been considered more carefully. For future choice, online surveys (Denscombe, 2009) rather than paper questionnaires may be administered to reduce item non-response rates and ensure better confidentiality. In terms of the interview protocol, more clarity of the interview themes, together with more well-balanced guidance of the researcher, could have been enhanced throughout the interviews to improve the quality of the interview data. A balance between specific and overall questions could have been better struck to allow interviewees themselves to expand and reflect on their responses. Face-to-face interviews may be conducted for future interviewing to explore more interactions between the interviewees and the researcher and the possibilities in capturing the interviewees' body language.

In addition, the research design of a mixed methods approach in this study has posed a challenge to the researcher for time management in undertaking both survey and interview research. For instance, although the research has to a large extent maximised the strengths of both quantitative and qualitative approaches, the amount of time needed for mixed methods research and the complexity of dealing with both statistical and qualitative data collection and analyses have been slightly different from what was expected. More methodological training is continuously needed for mastering rigorous and advanced methods of analysis.

4.12 Summary

Overall, this chapter has outlined and justified the pragmatic philosophical approach to the research design, and has justified and detailed the methodology of the study relating to a sequential mixed methods approach. Methods of teacher survey and semi-structured interviews were employed to investigate the breadth and depth of teachers' views on their professional development, PLCs and collaborative reflective enquiry practices. The data was convenience sampled at three secondary schools in one district of rural Sichuan Province, with 355 teachers for the survey and 14 for semi-structured interviews. All data was collected by the researcher in person and stored safely according to the UK Data Protection Act. The survey data was analysed to address RQ1, using SPSS descriptive statistics and two-way ANOVA. The interview data was analysed to address RQs 2 and 3, using thematic analysis to generate key codes and themes. Issues of validity, reliability and trustworthiness have been discussed, along with ethical issues and methodological limitations. Following this chapter, the quantitative and qualitative findings will be presented in Chapters 5 and 6 respectively.

Chapter 5 Quantitative Findings

5.1 Introduction

This chapter presents findings of the teacher survey to address RQ1 regarding "To what extent do teachers in three secondary schools of rural Sichuan Province, China report engagement in professional development, PLCs and collaborative reflective enquiry? Are there any differences in teachers' responses according to factors of school and teacher experience?". The chapter is structured, on the basis of the survey findings relating to teacher professional development, PLCs and collaborative reflective enquiry, to provide an overview of these practices across three schools. In each one of the sections on professional development, PLCs and collaborative reflective enquiry, descriptive statistics regarding the highest/lowest means and standard deviations of items is presented in the first place to demonstrate the extent of teachers' engagement in professional development, PLCs and collaborative reflective enquiry practices. Subsequently, the results of two-way ANOVA analyses are presented to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on all items of professional development, PLCs and collaborative reflective enquiry. Items that indicate statistically significant differences are highlighted.

The professional development of the survey focuses on items adopted from OECD TALIS 2008, with yes/no for the "participation" and four response categories for the subsequent "impact" (no, small, moderate and large) (OECD, 2009). The PLCs construct comprises five scales of "deprivatised practice, collective focus on student learning, reflective dialogue, collaborative activity and shared sense of purpose", which are adopted from OECD TALIS 2013 (OECD, 2016b). These scales are measured by either four response categories for "importance and agreement" or six response categories for "frequency". The construct of collaborative reflective enquiry consists of three scales regarding "collaboration, use of research and evidence, and reflection", which are measured by six response categories and adopted from OECD TALIS 2013 (OECD, 2016b) and the Welsh government survey (The Welsh Government, 2015).

5.2 RQ1. To What Extent Do Teachers in Three Secondary Schools of Rural Sichuan Province, China Report Engagement in Professional Development, PLCs and Collaborative Reflective Enquiry? Are There Any Differences in Teachers' Responses According to Factors of School and Teacher Experience?

5.2.1 Teacher Professional Development

The findings of teacher professional development will be presented in the following section, with a focus on teachers' participation in professional development activities and the impact of such participation on their development as teachers.

5.2.1.1 Participation

In terms of teachers' reported participation in professional development activities during the last 18 months, evidence from the survey indicates that all teachers' responses to seven items were generally more positive than negative. This is because all average item responses were above 0.5 with means ranging from 0.60 to 0.93 (0=No, 1=Yes). However, results show that teachers reported the lowest participation in the professional development activity of qualification programme (M=0.60; SD=0.491), in comparison to other professional development activities. Nevertheless, the percentage of teachers' participation in qualification programme still accounted for 60%, which may help explain the high percentage of teachers reporting Bachelor's Degree as the highest level of education (86.4%).

Table 18. Teachers' Participation in Professional Development: Three Items with the Highest/Lowest Mean and Standard Deviation

Highest mean	**M**	**SD**	**N**
8.1.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	**0.93**	0.260	330
8.1.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	**0.87**	0.336	294
8.1.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	**0.83**	0.376	295
Lowest mean	**M**	**SD**	**N**
8.1.4 Observation visits to other schools	**0.78**	0.413	272
8.1.6 Individual or collaborative research on a topic of interest to you professionally	**0.64**	0.480	264
8.1.3 Qualification programme (e.g. a degree programme)	**0.60**	0.491	248
Highest standard deviation	**M**	**SD**	**N**
8.1.3 Qualification programme (e.g. a degree programme)	0.60	**0.491**	248
8.1.6 Individual or collaborative research on a topic of interest to you professionally	0.64	**0.480**	264
8.1.4 Observation visits to other schools	0.78	**0.413**	272
Lowest standard deviation	**M**	**SD**	**N**

8.1.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	0.83	**0.376**	295
8.1.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	0.87	**0.336**	294
8.1.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	0.93	**0.260**	330

Total N=355; M=Mean (0=No; 1= Yes); SD=Standard Deviation

It is reported that, during the last 18 months, teachers participated the most frequently in professional development activities of courses/workshops (M=0.93), mentoring and/or peer observation and coaching (M=0.87), and education conferences or seminars (M=0.83). This finding indicates more traditional professional development activities in rural Sichuan, in comparison to ongoing, intensive and collaborative professional development activities such as participation in a network of teachers or individual or collaborative research. Also, teachers participated the least frequently in professional development activities of qualification programme (M=0.60), individual or collaborative research (M=0.64) and observation visits to other schools (M=0.78). This indicates a need for providing teachers with the activities of qualification programme, individual or collaborative research and observations visits to other schools.

Moreover, a two-way ANOVA was conducted on each item regarding teachers' participation in professional development activities to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views of their participation.

Table 19. Teachers' Participation in Professional Development: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**						**F (P)**		
	School			**Experience**			**School**	**Experience**	**Interaction**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more			
Participation									
8.1.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	.875 (113)	.898 (120)	.987 (87)	.904 (72)	.957 (135)	.899 (113)	**4.312 (.014)**	1.764 (.173)	2.250 (.064)

8.1.3 Qualification programme (e.g. a degree programme)	.429 (77)	.595 (96)	.742 (66)	.428 (62)	.592 (105)	.746 (72)	**7.047 (.001)**	**6.882 (.001)**	**2.573 (.039)**
8.1.4 Observation visits to other schools	.781 (92)	.758 (104)	.784 (68)	.673 (68)	.803 (114)	.847 (82)	.105 (.900)	**3.066 (.048)**	.162 (.957)
8.1.6 Individual or collaborative research on a topic of interest to you professionally	.450 (85)	.616 (100)	.849 (71)	.547 (68)	.638 (110)	.730 (78)	**13.276 (.000)**	2.674 (.071)	**2.583 (.038)**
8.1.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	.784 (98)	.858 (111)	.941 (76)	.759 (68)	.903 (122)	.921 (95)	**4.210 (.016)**	**5.083 (.007)**	.894 (.468)

Total N=355; M= Mean (0=No; 1= Yes); Significant items with Turkey differences (p<.05) highlighted in bold

Results show that there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 8.1.6 of *"*individual or collaborative research on a topic of interest*"* (F=2.583, P=.038). Simple main effects show that teachers in School C (M=.849) report higher participation in individual or collaborative research than those both in School A (M=.450) and in School B (M=.616). However, there are no statistically significant differences between teacher experience on this item. These findings indicate strong statistically significant differences between School C and Schools A and B in teachers' views of their participation in individual or collaborative research.

There is also a statistically significant interaction between the effects of "school" and "teacher experience" on the item 8.1.3 of "qualification programme" (F=2.573, P=.039). Simple main effects show that teachers in School C (M=.742) report much higher participation in qualification programme than those in School A (M=.429). Teachers with experience of 20 years or more (M=.746) report much higher participation in qualification programme than those with less than 4 years (M=.428). These findings indicate strong statistically significant differences between schools and teacher experience in teachers' views of their participation in qualification programme.

In addition, results show that there is a statistically significant difference between School A (M=.784) and School C (M=.941) regarding the item 8.1.7 of "mentoring and/or peer observation and coaching". This indicates that teachers in School C report slightly higher

participation in mentoring and coaching than those in School A. Also, there are statistically significant differences between responses from teachers with less than 4 years' experience (M=.759) and both 5-19 years (M=.903) and 20 years or more (M=.921) in teachers' participation in mentoring and/or peer observation and coaching. This indicates that teachers with less than 4 years' experience report slightly lower participation in mentoring and coaching, in comparison to those with experience of 5-19 years and 20 years or more. However, no statistically significant interaction is found between the effects of "school" and "teacher experience" on this item.

There is a statistically significant difference between School A (M=.875) and School C (M=.987) regarding the item 8.1.1 of "courses/workshops". This indicates that teachers in School C report slightly higher participation in courses/workshops than those in School A. However, no statistically significant differences between teacher experience are found on teachers' participation in courses/workshops. No statistically significant interaction is found between the effects of "school" and "teacher experience" on this item.

There is a statistically significant difference between responses from teachers with less than 4 years' experience (M=.673) and 20 years or more (M=.847) regarding the item 8.1.4 of "observation visits to other schools". This indicates that teachers with experience of 20 years or more report higher participation in observation visits to other schools. However, there are no statistically significant differences between schools in teachers' participation in observation visits to other schools. No statistically significant interaction is found between the effects of "school" and "teacher experience" on this item.

5.2.1.2 Impact

For those teachers indicating participation in particular professional development activities, evidence from the survey regarding the subsequent impact of their participation in these activities indicates that all teachers' responses to seven items were generally more positive than negative. This is because all average item responses were above 1.5 with means ranging from 1.96 to 2.20 (using the scale: 0=No impact; 1= A small impact; 2= A moderate impact; 3= A large impact). Nevertheless, results show that teachers considered that participation in a

network of teachers (item 8.2.5) had the least impact on their professional practice, even though overall differences between all item means were small.

Table 20. Impact of Professional Development: Three Items with the Highest/Lowest Mean and Standard Deviation

Highest mean	**M**	**SD**	**N**
8.2.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	**2.20**	0.701	229
8.2.6 Individual or collaborative research on a topic of interest to you professionally	**2.19**	0.711	150
8.2.3 Qualification programme (e.g. a degree programme)	**2.14**	0.718	128
Lowest mean	**M**	**SD**	**N**
8.2.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	**2.03**	0.654	232
8.2.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	**2.01**	0.661	285
8.2.5 Participation in a network of teachers formed specifically for the professional development of teachers	**1.96**	0.767	201
Highest standard deviation	**M**	**SD**	**N**
8.2.5 Participation in a network of teachers formed specifically for the professional development of teachers	1.96	**0.767**	201
8.2.3 Qualification programme (e.g. a degree programme)	2.14	**0.718**	128
8.2.4 Observation visits to other schools	2.07	**0.713**	186
Lowest standard deviation	**M**	**SD**	**N**
8.2.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	2.20	**0.701**	229
8.2.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	2.01	**0.661**	285
8.2.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	2.03	**0.654**	232

M=Mean (0=No impact; 1= A small impact; 2=A moderate impact; 3=A large impact); SD=Standard Deviation;
Note that only teachers who participated in professional development reported the impact of their participation.

Results indicate that professional development activities of mentoring and/or peer observation and coaching (M=2.20), individual or collaborative research (M=2.19) and qualification programme (M=2.14) were considered to have the largest impact on their development. This indicates that ongoing and collaborative professional development activities are considered to have a larger impact in the three schools. However, teachers reported participating the least frequently in the professional development activities of qualification programme and individual or collaborative research. This indicates a need for the schools participating in this study to promote teachers' participation in the professional development activities of "qualification programme" and "individual or collaborative research".

Moreover, a two-way ANOVA was conducted on each item regarding the perceived impact of professional development to examine the interaction effect of "school" (Schools A, B and C)

and “teacher experience” (less than 4 years, 5-19 years, and 20 years or more) on teachers’ views.

Table 21. Impact of Professional Development: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**			**F (P)**	**N**
	School			**School**	
	School A	School B	School C		
Impact					
8.2.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	1.628 (93)	2.060 (100)	2.330 (85)	**22.946 (.000)**	278
8.2.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	1.823 (73)	1.997 (86)	2.305 (65)	**8.154 (.000)**	224
8.2.3 Qualification programme (e.g. a degree programme)	1.980 (30)	1.906 (50)	2.637 (44)	**14.619 (.000)**	124
8.2.4 Observation visits to other schools	1.873 (61)	2.022 (68)	2.456 (50)	**9.685 (.000)**	179
8.2.5 Participation in a network of teachers formed specifically for the professional development of teachers	1.725 (65)	1.819 (72)	2.481 (57)	**19.219 (.000)**	194
8.2.6 Individual or collaborative research on a topic of interest to you professionally	1.917 (32)	1.936 (57)	2.570 (57)	**14.332 (.000)**	146
8.2.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	2.183 (68)	1.985 (86)	2.550 (69)	**11.965 (.000)**	223

M= Mean (0=No impact; 1= A small impact; 2=A moderate impact; 3=A large impact);
Significant items with Turkey differences (p<.05) highlighted in bold;
Note that no statistically significant differences are found between teacher experience across any of these items so the results are not included.

In terms of the impact of the professional development activities teachers participated in during the last 18 months, results show that there are statistically significant differences between schools across all items. However, no statistically significant differences are found between teacher experience across all the items on the impact of the professional development activities. Also, no statistically significant interactions are found between the effects of “school” and “teacher experience” on all the items. Overall, these findings have suggested a statistically significant difference between schools in the impact of professional development.

In particular, teachers in School C have reported a larger impact across all items, in comparison to those in Schools A and B. This indicates that teachers in School C consider that all professional development activities have a larger impact. However, no statistically significant differences in the impact of teachers’ participation in professional development are found between School A and School B regarding the items of 8.2.2 “education conferences

or seminars", 8.2.3 "qualification programme", 8.2.4 "observation visits to other schools", 8.2.5 "participation in a network of teachers formed specifically for the professional development of teachers", 8.2.6 "individual or collaborative research on a topic of interest to you professionally" and 8.2.7 "mentoring and/or peer observation and coaching, as part of a formal school arrangement". This indicates that teachers in Schools A and B report similar views on the above items in relation to the impact of their participation. Nevertheless, it is interesting to point out that there are statistically significant differences in the item 8.2.1 of "courses/workshops" between School A (M=1.628) and School B (M=2.060), between School B (M=2.060) and School C (M=2.330), and between School A (M=1.628) and School C (M=2.330). This suggests that teachers in the three schools all report different views of the impact of participation in courses/workshops on them as teachers.

To conclude, teachers participated the most frequently in the professional development activities of courses/workshops, mentoring and/or peer observation and coaching, and education conferences or seminars during the last 18 months. Mentoring and/or peer observation and coaching, individual or collaborative research on a topic of interest, and qualification programme were considered to have the largest impact on teachers' professional development. Very interestingly, although the activities of individual or collaborative research and qualification programme were considered to have the largest impact, teachers participated in them the least frequently. This indicates a further need for the three schools to provide teachers with more professional development opportunities in qualification programme and individual or collaborative research. In addition, although teachers participated in the activities of courses/workshops and education conferences or seminars the most frequently, both professional development activities were considered to have the least impact on their professional development. This indicates that the professional development activities of course/workshops and education conferences or seminars teachers participated in during the last 18 months are not necessarily effective.

5.2.2 PLCs

Teachers' attitudes to PLCs are considered in the survey based on the OECD PLCs scales of "deprivatised practice, collective focus on student learning, reflective dialogue, collaborative

activity and shared sense of purpose" (OECD, 2016). Results relating to the four scales of "deprivatised practice, collective focus on student learning, reflective dialogue and shared sense of purpose" are presented in this section. However, results regarding the scale of "collaborative activity" will be presented in the following section of collaborative reflective enquiry. This is because this scale has also been used for measuring collaborative reflective enquiry in this study, and such presentation will be used to avoid repetition.

5.2.2.1 Deprivatised Practice

Evidence from the survey regarding deprivatised practice, in terms of feedback from other teachers, indicates that approximately 80% of teachers were observed by other teachers on their classroom teaching, accounting for the highest percentage amongst other deprivatised activities. This indicates that classroom observation is the most frequent deprivatised activity for teachers to share knowledge and skills on teaching. However, participants reported the lowest participation in the deprivatised practice relating to surveys or discussion with parents or guardians, indicating that parents or guardians might not be actively engaged in teacher or school related activities in the three schools.

Table 22. Deprivatised Practice: All Items with Percentages

Highest percentage	**%**	**N**
10.1 Direct observation of your classroom teaching	**79.6**	179
10.4 An analysis of your students' test scores	**74.7**	168
10.5 Your self-assessment of your work (e.g. presentation of a portfolio assessment)	**63.6**	143
10.2 Student surveys about your teaching	**56.4**	127
10.3 An assessment of your content knowledge	**51.6**	116
10.6 Surveys or discussions with parents or guardians	**47.6**	107

Item N=225 (Total survey N=355; missing=36.6%)

Results show that teachers reported the highest participation in their deprivatised practice related to direct observation of classroom teaching (79.6%), an analysis of students' test scores (74.7%) and teachers' self-assessment of their work (e.g. presentation of a portfolio assessment) (63.6%). Whereas they reported the lowest participation in the deprivatised practice of surveys or discussions with parents or guardians (47.6%), an assessment of their content knowledge (51.6%) and student surveys about their teaching (56.4%).

Moreover, a two-way ANOVA was conducted on each item regarding teachers' deprivatised practice to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 23. Deprivatised Practice: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**						**F (P)**		
	School			**Experience**			**School**	**Experience**	**Interaction**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more			
Deprivatised practice									
10.1 Direct observation of your classroom teaching	.709 (61)	.714 (83)	.979 (75)	.821 (55)	.776 (91)	.806 (73)	**10.476 (.000)**	.232 (.794)	.396 (.811)
10.2 Student surveys about your teaching	.328 (61)	.378 (83)	.913 (75)	.452 (55)	.527 (91)	.640 (73)	**36.616 (.000)**	2.877 (.058)	.344 (.848)
10.3 An assessment of your content knowledge	.449 (61)	.221 (83)	.878 (75)	.518 (55)	.445 (91)	.586 (73)	**45.579 (.000)**	2.190 (.114)	.612 (.655)
10.4 An analysis of your students' test scores	.658 (61)	.576 (83)	.938 (75)	.598 (55)	.749 (91)	.823 (73)	**15.061 (.000)**	**4.309 (.015)**	.327 (.860)
10.5 Your self-assessment of your work (e.g. presentation of a portfolio assessment)	.526 (61)	.435 (83)	.933 (75)	.619 (55)	.528 (91)	.748 (73)	**26.727 (.000)**	**5.187 (.006)**	.982 (.418)
10.6 Surveys or discussions with parents or guardians	.272 (61)	.212 (83)	.882 (75)	.416 (55)	.405 (91)	.546 (73)	**57.113 (.000)**	2.689 (.070)	**2.948 (.021)**

Total N=355; M= Mean (0=No; 1=Yes); SD=Standard Deviation; Significant items with Turkey differences (p<.05) highlighted in bold.

Results show that there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 10.6 of surveys or discussions with parents or guardians (F=2.948, P=.021). Simple main effects show that there are statistically significant differences between School C (M=.882) and both School A (M=.272) and School B (M=.212). Teachers in School C have reported considerably higher participation in their deprivatised activity relating to surveys or discussions with parents or guardians. However, no statistically significant differences between teacher experience are found on this item. This indicates a strong school difference on this item.

Results also show that teachers in School C, in comparison to those in Schools A and B, have reported higher participation in deprivatised activities of direct observation of their classroom teaching, student surveys about their teaching, an assessment of their content knowledge, an analysis of their students' test scores and their self-assessment of work (e.g. presentation of a portfolio assessment). It seems that teacher in School C are positive about all items.

In addition, regarding the item 10.4 of an analysis of their students' test scores, results show that there are statistically significant differences between responses from teachers with experience of less than 4 years (M=.598) and both 5-19 years (M=.749) and 20 years or more (M=.823). This indicates that junior teachers (with less than 4 years' experience) seem to report lower participation in the deprivatised activity of analysing their students' test scores.

Overall, teachers have reported higher participation in deprivatised activities relating to direct observation of classroom teaching, an analysis of students' test scores, and self-assessment of work (e.g. presentation of a portfolio assessment). Particularly, teachers in School C have reported higher participation in all deprivatised practice.

5.2.2.2 Collective Focus on Student Learning

Evidence from the survey regarding students' collective focus on student learning is gathered using items on the measurement of the extent to which student performance is emphasised, alongside other factors related to student learning. The findings indicate that all teachers' responses to five items were generally more positive than negative, because all average item responses were above 1.5 with means ranging from 2.33 to 2.47 (using the scale: 0= Not considered at all; 1= Considered with low importance; 2= Considered with moderate importance; 3= Considered with high importance). Nevertheless, results show that teachers reported the least consideration and emphasis in student assessment practices (item 11.4).

Table 24. Collective Focus on Student Learning: All Items with Means and Standard Deviations

Highest mean	M	SD	N
11.5 Student behaviour and classroom management	**2.47**	0.645	349
11.3 Pedagogical competencies in teaching my subject fields	**2.42**	0.642	347
11.2 Knowledge and understanding of my subject fields	**2.40**	0.630	347

11.1 Student performance	**2.39**	0.670	351
11.4 Student assessment practices	**2.33**	0.653	341
Highest standard deviation	**M**	**SD**	**N**
11.1 Student performance	2.39	**0.670**	351
11.4 Student assessment practices	2.33	**0.653**	341
11.5 Student behaviour and classroom management	2.47	**0.645**	349
11.3 Pedagogical competencies in teaching my subject fields	2.42	**0.642**	347
11.2 Knowledge and understanding of my subject fields	2.40	**0.630**	347

Total N=355; M=Mean (0= Not considered at all; 1= Considered with low importance; 2= Considered with moderate importance; 3= Considered with high importance); SD=Standard Deviation

Results show that teachers' collective focus on student performance was considered with high importance (M=2.39), which is only slightly less important than the focus on student behaviour and classroom management (M=2.47). Student behaviour and classroom management (M=2.47) was considered with the highest importance. This indicates that teachers in the three schools focus slightly more on student behaviour and classroom management than on student performance. Relevant to student learning, teachers focused more on pedagogical competencies in teaching their subject fields (M=2.42) than on knowledge and understanding of their subject fields (M=2.40) and student assessment practices (M=2.33). However, it can be noticed that the mean differences across these three items were small.

Moreover, a two-way ANOVA was conducted on each item regarding the collective focus on student learning to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 25. Collective Focus on Student Learning: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**			**F (P)**
	School			**School**
	School A	School B	School C	
Collective focus on student learning				
11.1 Student performance	2.314 (116)	2.327 (130)	2.552 (89)	**3.456 (.033)**
11.2 Knowledge and understanding of my subject fields	2.357 (113)	2.311 (129)	2.616 (89)	**6.028 (.003)**
11.3 Pedagogical competencies in teaching my subject fields	2.448 (112)	2.312 (130)	2.677 (89)	**8.028 (.000)**
11.4 Student assessment practices	2.281 (109)	2.255 (128)	2.545 (88)	**5.196 (.006)**
11.5 Student behaviour and classroom management	2.452 (115)	2.371 (129)	2.638 (89)	**4.051 (.018)**

Total N=355; M= Mean (0= Not considered at all; 1= Considered with low importance; 2= Considered with moderate importance; 3= Considered with high importance); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;

Note that no statistically significant differences are found between teacher experience across any of these items so the results are not included.

Results show that, in terms of evidence relating to teachers' collective focus on student learning, there are statistically significant differences between schools across all items. However, there are no statistically significant differences between teacher experience on these items. Also, no statistically significant interactions are found between the effects of "school" and "teacher experience" on these items.

In addition, there are statistically significant differences between School B and School C in teachers' collective focus on student performance (item 11.1) and student behaviour and classroom management (item 11.5). Teachers in School C have focused slightly more on student performance and student behaviour and classroom management than those in School B. Apart from that, there are statistically significant differences between School C and Schools A and B in knowledge and understanding of their subject fields (item 11.2), pedagogical competencies in teaching their subject fields (11.3) and student assessment practices (item 11.4). Teachers in School C have focused slightly more on the above than those in Schools A and B. Overall, it seems that teachers in School C have had a relatively stronger focus on student performance and other practices that are relevant to student learning in the three schools.

5.2.2.3 Reflective Dialogue

Evidence from the survey regarding reflective dialogue, in terms of teachers' engagement in professional conversations about specific education issues, indicates that all teachers' responses to five items were generally more positive than negative. This is because all average item responses were above 1.5 with means ranging from 2.04 to 2.16 (using the scale: 0= No positive change; 1= A small change; 2= A moderate change; 3= A large change). Nevertheless, results show that teachers engaged the least frequently in the reflective activity relating to methods for teaching students with special needs (item 12.4).

Table 26. Reflective Dialogue: All Items with Means and Standard Deviations

Highest mean	M	SD	N

12.3 Your teaching practices	**2.16**	0.678	344
12.2 Your knowledge and understanding of your main subject fields	**2.11**	0.694	349
12.5 Your use of student assessment to improve student learning	**2.09**	0.732	350
12.1 Your classroom management practices	**2.06**	0.716	350
12.4 Your methods for teaching students with special needs	**2.04**	0.743	350
Highest standard deviation	**M**	**SD**	**N**
12.4 Your methods for teaching students with special needs	2.04	**0.743**	350
12.5 Your use of student assessment to improve student learning	2.09	**0.732**	350
12.1 Your classroom management practices	2.06	**0.716**	350
12.2 Your knowledge and understanding of your main subject fields	2.11	**0.694**	349
12.3 Your teaching practices	2.16	**0.678**	344

Total N=355; M=Mean (0= No positive change; 1= A small change; 2= A moderate change; 3= A large change); SD=Standard Deviation

Generally, teachers reported the most frequent engagement in their reflective activity of teaching practices (M=2.16), which is followed by knowledge and understanding of their main subject fields (M=2.11) and their use of student assessment to improve student learning (M=2.09). Nevertheless, it is worth noting that the change was reported to be moderate, suggesting a need for more reflective activities for teachers PLCs practices.

Moreover, a two-way ANOVA was conducted on each item regarding "reflective dialogue" to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 27. Reflective Dialogue: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**						**F (P)**	
	School			**Experience**			**School**	**Experience**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more		
Reflective dialogue								
12.1 Your classroom management practices	1.851 (116)	2.080 (129)	2.335 (89)	1.977 (75)	2.079 (140)	2.210 (119)	**10.414 (.000)**	2.498 (.084)
12.2 Your knowledge and understanding of your main subject fields	2.020 (115)	2.082 (129)	2.310 (89)	2.078 (75)	2.137 (140)	2.197 (118)	**4.042 (.018)**	.611 (.544)
12.3 Your teaching practices	2.034 (113)	2.158 (126)	2.397 (89)	2.158 (75)	2.114 (135)	2.316 (118)	**6.236 (.002)**	2.805 (.062)
12.4 Your methods for teaching students with special needs	1.898 (116)	1.932 (129)	2.321 (89)	1.879 (75)	2.081 (140)	2.191 (119)	**8.903 (.000)**	**3.738 (.025)**

Total N=355; M= Mean (0= No positive change; 1= A small change; 2= A moderate change; 3= A large change); SD=Standard Deviation; Significant items with Turkey differences (p<.05) highlighted in bold;

Results show that, in terms of reflective dialogue, there are statistically significant differences between School C and both School A and School B in classroom management practices (item 12.1), teaching practices (item 12.3) and methods for teaching students with special needs (item 12.4). Teachers in school C have reported more frequent engagement in the above reflective activities than those in Schools A and B. There is also a statistically significant difference between School C and School A in knowledge and understanding of main subject fields (item 12.2). Teachers in School C, in comparison to those in School A, have reported more frequent engagement in reflective activities on knowledge and understanding of their main subject fields. It seems that teachers in School C are more positive about all items.

Regarding the item 12.4 methods for teaching students with special needs, it is found that there is a statistically significant difference between responses from teachers with less than 4 years' experience (M=2.412) and 20 years or more (M=2.556). This indicates that teachers with the experience of 20 years or more have reported more frequent engagement in reflective activities relating to methods for teaching students with special needs than those with less than 4 years.

Nevertheless, no statistically significant differences are found regarding the item 12.5 of use of student assessment to improve student learning, according to factors of both school and teacher experience. This indicates that teachers participating in this study are unanimously positive about their use of student assessment to improve student learning.

Overall, teachers have reported more frequent engagement in reflective activities relating to their teaching practices, knowledge and understanding of their main subject fields, and use of student assessment to improve student learning. Teachers in School C generally have reported more frequent engagement in reflective activities.

5.2.2.4 Shared Sense of Purpose

Shared sense of purpose was measured in the survey based on teachers' agreement on the school' mission and its operational principles. The findings indicate that all teachers' responses to both items were generally more positive than negative, because all average item responses were above 2.0 with means ranging only slightly from 2.13 to 2.19 (using the scale: 0=Strongly disagree; 1= Disagree; 2=Agree; 3=Strongly agree).

Table 28. Shared Sense of Purpose: Both Items with Means and Standard Deviations

Highest mean	**M**	**SD**	**N**
14.2 There is a collaborative school culture which is characterised by mutual support	**2.19**	0.670	350
14.1 This school has a culture of shared responsibility for school issues	**2.13**	0.586	350
Highest standard deviation	**M**	**SD**	**N**
14.2 There is a collaborative school culture which is characterised by mutual support	2.19	**0.670**	350
14.1 This school has a culture of shared responsibility for school issues	2.13	**0.586**	350

Total N=355; M=Mean (0=Strongly disagree; 1= Disagree; 2=Agree; 3=Strongly agree); SD=Standard Deviation

Results show that teachers generally agreed that there was a collaborative school culture which was characterised by mutual support (M=2.19). Teachers also agreed that their schools had a culture of shared responsibility for school issues (M=2.13). This indicates that teachers in the three schools are generally positive about their school cultures. However, the means of both items are still slightly lower than those of other PLCs scales, indicating a need for promoting shared sense of purpose.

Moreover, a two-way ANOVA was conducted on each item regarding shared sense of purpose to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 29. Shared Sense of Purpose: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests

Items that indicate statistically significant differences	**M (N)**						**F (P)**	
	School			**Experience**			**School**	**Interaction**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more		
Shared sense of purpose								
14.1 This school has a culture of shared responsibility for school issues	2.088 (116)	2.101 (129)	2.298 (89)	2.150 (74)	2.164 (140)	2.172 (120)	**3.447 (.033)**	1.388 (.238)
14.2 There is a collaborative school culture which is	2.055 (117)	2.157 (130)	2.410 (87)	2.208 (74)	2.190 (139)	2.224 (121)	**6.380 (.002)**	**2.958 (.020)**

characterised by mutual support								

Total N=355; M= Mean (0=Strongly disagree; 1= Disagree; 2=Agree; 3=Strongly agree); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;
Note that no statistically significant differences are found between teacher experience across any of these items so the results are not included.

Results show that there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 14.2 that there is a collaborative school culture which is characterised by mutual support (F=2.958, P=.020). Simple main effects show that teachers in School C (M=2.410) agree more strongly than those both in School B (M=2.157) and in School A (M=2.055) on the collaborative school culture characterised by mutual support. However, there are no statistically significant differences between teacher experience on this item. These findings indicate a strong difference between schools in collaborative school cultures characterised by mutual support.

With regard to whether the three schools have a culture of shared responsibility for school issues (item 14.1), results show that there is a statistically significant difference between School B (M=2.101) and School C (M=2.298). Teachers in School C have been slightly more positive about the culture of shared responsibility for school issues, in comparison to those in School B. However, no statistically significant differences are found between teacher experience on this item. There is no statistically significant interaction between the effects of "school" and "teacher experience" on this item.

Overall, the findings indicate that there is a collaborative school culture which is characterised by mutual support in the three schools. The schools have a culture of shared responsibility for school issues. There is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 14.2 that there is a collaborative school culture which is characterised by mutual support. Teachers in School C, in comparison to those in Schools A and B, agree more strongly on the collaborative school culture characterised by mutual support.

5.2.3 Collaborative Reflective Enquiry

The concept of collaborative reflective enquiry in this study is measured by three elements regarding "collaboration, use of research and evidence and reflection". The element of collaboration builds on the PLCs scale of "collaborative activity". Results relating to these three elements will be presented in this section respectively.

5.2.3.1 Collaboration

Evidence from the survey regarding collaboration indicates that all teachers' responses to four items were generally more positive than negative, typically indicating frequent monthly collaborative activities. This is because all average item responses were above 3.7 with means ranging from 3.72 to 4.31 (using the scale: 0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more). Nevertheless, results show that teachers reported the lowest participation in the collaborative activity of working with other teachers in their school to ensure common standards in evaluations for assessing student progress (item 13.3).

Table 30. Collaboration: All Items with Means and Standard Deviations

Highest mean	**M**	**SD**	**N**
13.4 Attend team conferences	**4.31**	1.090	347
13.2 Engage in discussions about the learning development of specific students	**3.99**	1.200	350
13.1 Exchange teaching materials with colleagues	**3.76**	1.468	349
13.3 Work with other teachers in my school to ensure common standards in evaluations for assessing student progress	**3.72**	1.336	352
Highest standard deviation	**M**	**SD**	**N**
13.1 Exchange teaching materials with colleagues	3.76	**1.468**	349
13.3 Work with other teachers in my school to ensure common standards in evaluations for assessing student progress	3.72	**1.336**	352
13.2 Engage in discussions about the learning development of specific students	3.99	**1.200**	350
13.4 Attend team conferences	4.31	**1.090**	347

Total N=355; M=Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation

Teachers reported the highest participation in the collaborative activity of attending team conferences (M=4.31), which is followed by engaging in discussions about the learning development of specific students (M=3.99) and exchanging teaching materials with colleagues (M=3.76). This indicates that teachers in the three schools attend team conferences, engage in discussions about the learning development of specific students, and exchange teaching materials with colleagues typically 1-3 times a month. Also, the spread of teacher responses varies across all items with standard deviations ranging from 1.090 to

1.468. This means that there is relatively more consensus amongst teachers for particular items in comparison to others, such as the item 13.4 of attending team conferences (M=4.31; SD=1.090). There is more variation amongst teachers for the item 13.1 of exchanging teaching materials with colleagues (M=3.76; SD=1.468).

Moreover, a two-way ANOVA was conducted on each item regarding the collaboration element of collaborative reflective enquiry to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 31. Collaboration: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**			**F (P)**
	School			**School**
	School A	School B	School C	
Collaboration				
13.2 Engage in discussions about the learning development of specific students	3.694 (119)	4.099 (126)	4.288 (89)	**5.632 (.004)**

Total N=355; M= Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;
Note that no statistically significant differences are found between teacher experience across any of these items so the results are not included.

In terms of engaging in discussions about the learning development of specific students (item 13.2), results show that there are statistically significant differences between School A (M=3.694) and both School B (M=4.099) and School C (M=4.288). This indicates that teachers in School A are less engaged in discussions about the learning development of specific students, in comparison to those in Schools B and C. However, there is no statistically significant difference between teacher experience on this item. Also, no statistically significant difference is found between the effects of "school" and "teacher experience".

Apart from the item 13.2, there are no statistically significant differences on items of 13.1 exchanging teaching materials with colleagues, 13.3 working with other teachers in my school to ensure common standards in evaluations, and 13.4 attending team conferences, according to factors of both school and teacher experience. This indicates that teachers in the three schools are unanimously positive about their collaborative activities.

5.2.3.2 Use of research and evidence

Evidence from the survey regarding the frequency of teachers' use of research and evidence indicates that all teachers' responses to six items were generally more positive than negative. This is because all average item responses were above 2.5 with means ranging from 2.99 to 3.58 (using the scale: 0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more).

Table 32. Use of Research and Evidence: Three Items with the Highest/Lowest Mean and Standard Deviation

Highest mean	**M**	**SD**	**N**
9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?	**3.58**	1.411	341
9.13 How often do you incorporate ideas from professional development activities into your practice?	**3.36**	1.506	338
9.10 How often do you compare different sources of evidence when deciding what actions to take?	**3.32**	1.465	333
Lowest mean	**M**	**SD**	**N**
9.6 How often do you 'look outside' the school for inspiration?	**3.27**	1.531	342
9.9 How often do you read relevant research literature?	**3.09**	1.516	320
9.12 How often do you evaluate your professional development activities, such as attending courses?	**2.99**	1.519	339
Highest standard deviation	**M**	**SD**	**N**
9.6 How often do you 'look outside' the school for inspiration?	3.27	**1.531**	342
9.12 How often do you evaluate your professional development activities, such as attending courses?	2.99	**1.519**	339
9.9 How often do you read relevant research literature?	3.09	**1.516**	320
Lowest standard deviation	**M**	**SD**	**N**
9.13 How often do you incorporate ideas from professional development activities into your practice?	3.36	**1.506**	338
9.10 How often do you compare different sources of evidence when deciding what actions to take?	3.32	**1.465**	333
9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?	3.58	**1.411**	341

Total N=355; M=Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation

In terms of use research and evidence, teachers reported the highest frequency in undertaking action research as a result of reflecting upon learning and teaching (M=3.58), incorporating ideas from professional development activities into practice (M=3.36) and comparing different sources of evidence when deciding what actions to take (M=3.32). However, teachers engaged less frequently in the use of research and evidence related to looking outside the school for inspiration (M=3.27), reading relevant research literature (M=3.09) and evaluating their professional development activities (M=2.99). This indicates a need for promoting teachers' engagement in research and evidence use regarding evaluating their professional development activities, reading relevant research literature and looking

outside the school for inspiration**.** In particular, teachers in the three schools reported a slightly higher frequency in different sources of evidence (M=3.32) than that in research literature (M=3.09), despite their overall positive responses.

Moreover, a two-way ANOVA was conducted on each item regarding the element of use of research and evidence to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 33. Use of Research and Evidence: Items with Statistically Significant Differences between Schools Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**			**F (P)**
	School			**School**
	School A	School B	School C	
Use of research and evidence				
9.10 How often do you compare different sources of evidence when deciding what actions to take?	2.931 (113)	3.414 (125)	3.707 (81)	**5.932 (.003)**
9.12 How often do you evaluate your professional development activities, such as attending courses?	2.662 (114)	3.082 (128)	3.306 (82)	**3.859 (.022)**
9.13 How often do you incorporate ideas from professional development activities into your practice?	2.982 (114)	3.426 (129)	3.691 (80)	**4.479 (.012)**

Total N=355; M= Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;
Note that no statistically significant differences are found between teacher experience across any of these items so the results are not included.

Results show that there are statistically significant differences between School A and School C in the frequencies of teachers' use of research and evidence relating to comparing different sources of evidence when deciding what actions to take (item 9.10), evaluating professional development activities (item 9.12) and incorporating ideas from professional development activities into their practice (item 9.13). Teachers in School C, in comparison to those in School A, have reported higher frequencies in using the above evidence. However, there are no statistically significant differences between teacher experience on these items. Also, no statistically significant interactions are found between the effects of "school" and "teacher experience" on these items.

Overall, teachers in the three schools have engaged the most frequently in the use of research and evidence related to undertaking action research as a result of reflecting upon learning and teaching, incorporating ideas from professional development activities into their

practice, and comparing different sources of evidence when deciding what actions to take the most frequently. Teachers have reported a slightly higher frequency in different sources of evidence, in comparison to research literature, despite their overall positive responses.

5.2.3.3 Reflection

In terms of reflection, evidence from the survey indicates that all teachers' responses to seven items were generally more positive than negative. This is because all average item responses were above 2.5 with means ranging from 3.54 to 4.24 (using the scale: 0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more). Nevertheless, results show that teachers reflected the least frequently on evaluating their lessons (item 9.1), despite overall positive responses.

Table 34. Reflection: Three Items with the Highest Mean and Standard Deviation

Highest mean	**M**	**SD**	**N**
9.4 How often do you talk to a colleague about learning and teaching?	**4.24**	1.195	349
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	**4.03**	1.374	339
9.5 How often do you apply wise suggestions to improve your practice?	**3.98**	1.239	345
Lowest mean	**M**	**SD**	**N**
9.3 How often do you modify your lessons as a result of reflection?	**3.82**	1.365	344
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?	**3.69**	1.463	342
9.1 How often do you evaluate your lessons?	**3.54**	1.490	342
Highest standard deviation	**M**	**SD**	**N**
9.1 How often do you evaluate your lessons?	3.54	**1.490**	342
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?	3.69	**1.463**	342
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	4.03	**1.374**	339
Lowest standard deviation	**M**	**SD**	**N**
9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?	3.97	**1.278**	324
9.5 How often do you apply wise suggestions to improve your practice?	3.98	**1.239**	345
9.4 How often do you talk to a colleague about learning and teaching?	4.24	**1.195**	349

Total N=355; M=Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation

Evidence indicates that teachers reflected on their practices the mostly frequently through talking to a colleague about learning and teaching (M=4.24), discussing in team/staff meetings about how to improve the quality of learning and teaching (M=4.03), and applying wise suggestions to improve their practice (M=3.98). Also, the spread of teacher responses varies across all items with standard deviations ranging from 1.195 to 1.490. It seems that

there is relatively more consensus amongst teachers for particular items in comparison to others, such as the item 9.4 regarding the extent to which teachers talk to a colleague about learning and teaching (M=4.24; SD=1.195). There is more variation amongst teachers for the item 9.1 relating to the extent to which they evaluate their lessons (M=3.54; SD=1.490).

Moreover, a two-way ANOVA was conducted on each item regarding the reflection element of collaborative reflective enquiry to examine the interaction effect of "school" (Schools A, B and C) and "teacher experience" (less than 4 years, 5-19 years, and 20 years or more) on teachers' views.

Table 35. Reflection: Items with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests

Items with statistically significant differences	**M (N)**						**F (P)**	
	School			**Experience**			**School**	**Experience**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more		
Reflection								
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	4.356 (113)	4.243 (129)	3.627 (82)	4.263 (73)	3.806 (137)	4.158 (114)	**6.963 (.001)**	**3.363 (.036)**

Total N=355; M= Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;

In terms of teachers' reflection on their discussions about how to improve the quality of learning and teaching in team/staff meetings (item 9.8), results show that there is a statistically significant difference between School C (M=3.627) and both School A (M=4.356) and School B (M=4.243). Surprisingly, teachers in School C have reported less frequent reflection on their discussions about how to improve the quality of learning and teaching in team/staff meetings, in comparison to those in Schools A and B. This finding contradicts the results relating to teachers' collaborative activity that teachers in School C have reported higher participation in the collaborative activity of discussions about the learning development of specific students (item 13.2). The reason for this contradiction is unclear but may point to a limitation on the findings due to ambiguity in the phrasing of survey items.

Overall, teachers have reflected on their practice the most frequently through talking to a colleague about learning and teaching, discussing about how to improve the quality of learning and teaching in team/staff meetings, and applying wise suggestions to improve their practice. Teachers in School C have reflected less frequently on their discussions about how to improve the quality of learning and teaching in team/staff meetings (item 9.8), in comparison to those in Schools A and B.

5.2.3.4 Research Engagement

In order to obtain supplementary data for teachers' attitudes towards their research use, a survey of research engagement with five scales was adopted from previous research (J. Nelson et al., 2017) to examine teachers' use of *academic research*, adding to their collaborative reflective enquiry practices. The five scales of research engagement in this study comprised "teachers' positive disposition to academic research in informing teaching practice", "use of academic research to inform selection of teaching approaches", "teachers' perception that academic research is not useful to teaching", "teachers' perception that own school does not encourage use of academic research", and "active engagement with online evidence platforms". Given that the focus is not on the variations of teachers' responses towards research engagement, frequencies are reported to indicate teachers' general attitudes (see Appendix 10).

For instance, in terms of "teachers' positive disposition to academic research in informing teaching practice", 38.9% of the teachers found understanding academic research *not very easy*, accounting for the highest percentage. However, more than half (55.4%) of the teachers agreed that information from research plays an important role in informing their teaching practice. This indicates that teachers are aware of the importance of research use although some teachers may find understanding academic research not very easy. Also, nearly half (48.7%) of the teachers knew where to find relevant research that may help to inform teaching methods/practice. More than half (51.3%) of the teachers were able to relate information from research to their context. 43.8% of the teachers felt confident about analysing information from research, and 46.7% of the teachers used information from

research to help them to decide how to implement new approaches in the classroom. These all indicate that teachers generally seem to have a positive disposition to academic research in informing their teaching practice.

With regard to "use of academic research to inform selection of teaching approaches", 55.3% of the teachers reported that academic research was important in identifying a specific approach they used. Similarly, 56.5% of the teachers thought that academic research had some influence on their decision to adopt pedagogical approaches. Yet, nearly half (48.3%) of the teachers only consulted academic research *a little*. This suggests that teachers acknowledge the importance of academic research in identifying their pedagogical approaches but may have not consulted academic research often.

As for "teachers' perception that academic research is not useful to teaching", more than one third (36.4%) of the teachers agreed that using information from research will help to improve pupil outcomes. 31.6% of the teachers disagreed that information from research conducted elsewhere is of limited value to their school. This indicates that teachers do value the usefulness of research in improving student outcomes.

In terms of "teachers' perception that own school does not encourage use of academic research", more than one third (37.4%) of the teachers agreed that their school leaders/governors encourage them to use information from research to improve their practice. Around one third (33.7%) disagreed that other staff in their school rarely use information from research to inform their teaching practice. This indicates that the use of academic research is encouraged in their school and that some teachers do use information from research.

With regard to "active engagement with online evidence platforms", nearly half (49.6%) of the teachers only consulted online platforms *a little*, although around one third (33.2%) of the teachers found understanding online platforms quite easy. This indicates that there is still room for improvement in teachers' use of online platforms.

Besides, the findings of the survey regarding research engagement also indicate that ideas generated by teachers or their school, academic research, and teacher experience were considered the most important in identifying teachers' pedagogical approaches. The concept of evidence-based teaching was perceived by teachers in the three schools as "using an online evidence platform/database and applying the learning", "learning from colleagues and applying the learning", and "conducting action research and applying the learning".

Table 36. Research Engagement: Scales with Statistically Significant Differences between Schools and Teacher Experience Based on Two-way ANOVA and Post Hoc Tests

Scales with statistically significant differences	**M (N)**						**F (P)**	
	School			**Experience**			**School**	**Experience**
	School A	School B	School C	Less than 4 years	5-19 years	20 years or more		
Research engagement								
Scale 1. Teachers' positive disposition to academic research in informing teaching practice	1.793 (104)	1.931 (123)	2.721 (86)	2.240 (68)	2.113 (136)	2.092 (109)	**58.289 (.000)**	1.291 (.276)
Scale 2. Use of academic research to inform selection of teaching approaches	1.136 (90)	1.181 (110)	1.786 (88)	1.404 (68)	1.397 (123)	1.302 (97)	**75.507 (.000)**	2.121 (.122)
Scale 3. Teachers' perception that academic research is not useful to teaching	1.307 (106)	1.403 (127)	.494 (88)	.863 (70)	1.066 (136)	1.274 (115)	**36.613 (.000)**	**5.695 (.004)**
Scale 4. Perception that own school does not encourage use of academic research	1.276 (109)	1.355 (127)	.488 (88)	.864 (71)	1.079 (138)	1.175 (115)	**33.011 (.000)**	**3.135 (.045)**
Scale 5. Active engagement with online evidence platforms	1.635 (92)	1.725 (104)	2.551 (63)	1.917 (63)	1.986 (112)	2.008 (84)	**29.609 (.000)**	.254 (.776)

Total N=355; M= Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation;
Significant items with Turkey differences (p<.05) highlighted in bold;

Results show that there are statistically significant differences between schools across all scales. Teachers in School C have reported higher frequencies towards the scales of teachers' positive disposition to academic research in informing teaching practice, use of academic research to inform selection of teaching approaches and active engagement with online evidence platforms, in comparison to those in Schools A and B. However, teachers in School C have reported lower frequencies than those in Schools A and B to the scales of perceptions that academic research is not useful to teaching and that their school does not encourage use

of academic research. This indicates that teachers in School C, in comparison to those in Schools A and B, are more positive about the usefulness of academic research to teaching and their schools' encouragement of use of academic research.

Also, regarding the scale of teachers' perception that academic research is not useful to teaching, results show that there are statistically significant differences between the responses from teachers with experience of 20 years or more and both less than 4 years and 5-19 years. Teachers with experience of 20 years or more have reported a higher frequency than those with both less than 4 years and 5-19 years towards their perception that academic research is not useful to teaching. This indicates that less experienced teachers are more positive about the usefulness of academic research.

5.3. Summary

To conclude, the results of the teacher survey have indicated that teachers are generally positive about their engagement in their professional development, PLCs and collaborative reflective enquiry practices, addressing RQ1. In particular, teachers in School C have been mostly more positive than those in Schools A and B. This indicates a statistically significant difference in "school", rather than "teacher experience", based on the data collected for this study. This school difference will be discussed in Chapter 7 Discussion. In terms of teachers' professional development, teachers have reported the highest participation in courses/workshops, mentoring and/or peer observation and coaching, and education conferences or seminars. They have reported the lowest participation in qualification programme, individual or collaborative research, and observation visits to other schools. However, professional development activities of mentoring and/or peer observation and coaching, individual or collaborative research, and qualification programme have been considered to have the largest impact. These results have indicated a need for the three schools to provide teachers with more professional development opportunities in qualification programme and individual or collaborative research. Also, *there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 8.1.6 of "individual or collaborative research".* Teachers in School C have reported higher participation in individual or collaborative research than those in Schools A and B. However,

there are no statistically significant differences between teacher experience on this item. This indicates that teachers in School C have participated more frequently in the professional development activity of individual or collaborative research, in comparison to those in Schools A and B.

With regards to PLCs practices, teachers have reported slightly less frequent engagement in the PLCs practices of "reflective dialogue" and "shared sense of purpose" than that in other types of PLCs practices. Teachers have reflected the most frequently on teaching practices but the least frequently on methods for teaching students with special needs. Teachers agree that there is a collaborative school culture which is characterised by mutual support and that this school has a culture of shared responsibility for school issues. The results have indicated that there is a need to promote the PLCs practices of "reflective dialogue" and "shared sense of purpose" in the three schools. Also, *there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 14.2 that there is a collaborative school culture which is characterised by mutual support.* Teachers in School C agree more strongly than those in Schools A and B on the collaborative school culture characterised by mutual support. However, there are no statistically significant differences between teacher experience on this item. This indicates that there is a stronger collaborative school culture in School C.

In terms of collaborative reflective enquiry, teachers have reported slightly less frequent engagement in "use of research and evidence" than that in "collaboration" and "reflection". Teachers have used the most frequently the research and evidence of undertaking action research as a result of reflecting upon learning and teaching, incorporating ideas from professional development activities into your practice, and comparing different sources of evidence when deciding what actions to take. They have used the least frequently the research and evidence of evaluating their professional development activities, reading relevant research literature, and looking outside the school for inspiration. These results have indicated a need for promoting teachers' use of research and evidence, particularly in evaluating their professional development activities, reading relevant research literature, and looking outside the school for inspiration. Following this chapter, the qualitative findings will be presented in the following Chapter 6.

Chapter 6 Qualitative Findings

6.1 Introduction

This chapter presents findings from semi-structured interviews with 14 teachers from three schools in rural Sichuan Province, China. The interview data has been analysed using "thematic analysis" to generate key themes and quotes on teachers' collaborative reflective enquiry practices (see Appendix 12). The analysis of the interview data has been guided by the analytical framework of collaborative reflective enquiry outlined in Section 4.8.2 Interview Analysis. The results of the analysis are used to address RQ2 by providing key examples that can illustrate teachers' views of the concept, typical features and perceived benefits of collaborative reflective enquiry, and the challenges for their collaborative reflective enquiry practices. The results of the analysis are also employed to address RQ3 relating to the strategies that could improve teachers' collaborative reflective enquiry practices in rural Sichuan Province, China. Overall, this chapter is structured, using RQs 2 and 3 as sub-headings, to present teachers' views of the concept, typical features, perceived benefits of collaborative reflective enquiry and the challenges and strategies.

6.2 RQ2. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Concept, Typical Features and Perceived Benefits of Collaborative Reflective Enquiry and the Challenges for Their Collaborative Reflective Enquiry Practices?

6.2.1 Concept: To Explore and Research Collaboratively for Improving Teaching and Learning

The concept of collaborative reflective enquiry in this study depends largely on the extent to which the term of enquiry is understood and interpreted. In terms of teacher professional development, this teacher emphasised the exploratory nature of enquiry and the importance of research as follows:

> "…In my impression, enquiry literally means to *tansuo* (explore) and *yanjiu* (research) something…basically to explore something deeper based on what has been understood…" (SchBToMaths)

More specifically, this teacher used a typical example of teacher collaborative reflective enquiry in school, *Collective Lesson Planning*, to illustrate the essence of collaborative reflective enquiry as *a form of research into teaching* as follows:

> "…I think enquiry means to *tansuo* (explore) and *yanjiu* (research) something. *It is about conducting research on teaching and learning, a way of innovation.* The Collective Lesson Planning in my school can be a form of teacher collaborative reflective enquiry but is only about basic research on classroom management and the delivery of the curriculum etc…However, I think the word enquiry carries a meaning that is even deeper. What we do as teachers on a daily basis is just about discussions, but enquiry means to explore something deeper…" (SchBToEnglish)

It is noticed that this teacher indicated a deeper meaning of enquiry itself by questioning the depth of lesson planning and research in the school. From a relatively broader perspective, this teacher provided helpful insights into differentiating the focus of teachers' collaborative reflective enquiry as follows:

> "…In secondary schools, there are primarily two types of enquiry…One is teacher-oriented enquiry. Teacher-oriented enquiry generally means *jiaoxue yanjiu* (teaching and research), a type of reflection as a form of enquiry. Of course, literally, enquiry itself means a sort of self-awareness of taking initiatives, and of being willing to test out new ideas about subject knowledge, curriculum and pedagogy as well as students' approaches to learning, to research these ideas, and to inform changes in practice… The other is what we mean by student-oriented enquiry which is characterised by peer collaboration and independent learning…" (SchBToICT)

It can be noticed from the above quote that the meaning of enquiry from these teachers' perspectives may vary, depending on its focus and purpose. However, given the focus of this study on collaborative reflective enquiry for teachers' professional development, the term enquiry is used for the purpose of promoting teachers' professional development and learning. Such enquiry is understood as a form of professional development practice associated with research into teaching. This is the meaning of the enquiry that underpins this study.

Nevertheless, teachers also mentioned in the interviews that enquiry could centre on students and be understood as a student-centred pedagogical approach. Such enquiry can be

situated in classroom teaching for student learning, emphasising the role of the teacher in guiding students to explore, reflect on and solve learning problems in classrooms. Yet, these perspectives of student-centred and enquiry-based teaching will only be viewed in this study to be additional and supplementary.

6.2.2 Typical Features: Focus on Teaching and Curriculum, Relevance to Student Learning, Formal and Informal Collaboration, Collaborative and Individual Reflection, Use of Evidence and Academic Research, Iterative Process of Enquiry, and Leadership Support

The typical features of teachers' collaborative reflective enquiry in this study are generally identified regarding focus on teaching and curriculum, relevance to student learning, formal and informal collaboration, collaborative and individual reflection, use of evidence (exam results, student homework, and teacher experience) and academic research, iterative process of enquiry and leadership support. These features are discussed primarily in terms of Collective Lesson Planning as a typical form of collaborative reflective enquiry practice across three schools. The collaborative reflective enquiry relating to Collective Lesson Planning in this study is in line with the definition and scope of collaborative reflective enquiry mentioned in Chapter 1 Introduction and Chapter 3 Literature Review. It is also associated with a relatively formal school structure of Teaching and Research Groups. Hence, the collaborative reflective enquiry (Collective Lesson Planning) of this study is perceived to be an illustrative example of collaborative reflective enquiry practice in rural China, which is relatively structural and formal in nature and focuses on research into teaching for enhancing teaching practices and student learning.

6.2.2.1 Focus on Teaching and Curriculum

The key focus of the collaborative reflective enquiry for teachers' professional development in this study is on teaching and curriculum. Teachers gather together, research different approaches to lesson planning, and share their knowledge and experience in selecting pedagogical approaches to the delivery of the curriculum. This process of collaborative reflective enquiry can contribute to teachers' better understanding of curriculum and

pedagogy. For example, this teacher described the focus of Collective Lesson Planning as follows:

> "... Before the new term starts, all teachers will be allocated with different tasks. The tasks are allocated differently according to the *syllabus* that teachers need to prepare for the lesson. Then two teachers will plan lessons independently. Once attending the Collective Lesson Planning meetings, these two teachers will need to present the planning and structuring of that session, with pre-prepared PPTs. Then all other teachers will discuss about the issues on the PPTs...Teachers will provide both teachers with feedback and comments on the areas for improvement…" (SchBToChinese)

Similarly, this teacher mentioned that teachers typically started with reviewing issues and problems related to teaching and learning and then focused on the planning details with lead teachers presenting and others discussing and providing feedback. The following quote can illustrate what the focus of Collective Lesson Planning is like:

> "…We discuss what happened last week. Sometimes unexpected issues arise during classroom teaching, so we need to discuss about these issues and solve the problem. This is the task we need to complete first. Then, we plan for next week. For example, we prepare for lessons together, coordinated by the lead teacher. The lead teacher will present his/her teaching philosophy and lesson planning in the first place. Then other teachers will discuss. Some teachers may learn from the teaching planning whilst others may contribute better ideas (to the lesson planning). They complement each other somehow…" (SchAToChemistry)

This teacher emphasised the focus of Teaching and Research Groups meetings on the delivery of the curriculum and especially the difficult and/or important issues related to curriculum:

> "…Typically, when we start the Teaching and Research Groups meetings, we will need to reach an agreement in the extent to which the curriculum content needs to be covered. Then we will see how we could deliver that, for example through four sessions or seven sessions? Then we will discuss what is more difficult and/or important for us to deliver…Afterwards, we will explore with one another to address that issue. This is how we do it…" (SchBToMaths)

Teaching and Research Groups meetings focus on "research" into teaching and can facilitate good opportunities for teachers at different career stages to share their ideas and practices for improving pedagogical approaches. For example, it is mentioned that

> "For the Teaching and Research Groups meetings, what we do first is to plan ahead. It would be the case where new teachers present their lesson planning and/or *gu gan* (backbone) teachers do demonstration lessons. All teachers in the School will get together and give comments on the lessons demonstrated. The teachers giving presentations will need to talk about his teaching design and thoughts, and other teachers listening to the presentation will then comment on the lesson planning and give their recommendations…" (SchCToMaths)

Overall, it can be noticed from the above quotes that the collaborative reflective enquiry practices identified in this study, especially in terms of Collective Lesson Planning, have a strong focus on teaching and curriculum. Teachers undertake "research" into teaching by planning lessons collaboratively.

6.2.2.2 Relevance to Student Learning

The collaborative reflective enquiry practices of this study are aimed at improving teachers' pedagogical approaches to ultimately support and enhance student learning. The relevance of collaborative reflective enquiry to student learning can be demonstrated by teachers' understandings of the importance of identifying student learning needs through Collective Lesson Planning. For example, this teacher considered as follows:

> "The process of Collective Lesson Planning is to understand our students. This means that we need to know at which level our students are, and the lessons need planning based on students' needs…usually we plan our lessons based on students' needs. We also plan the lessons based on textbooks and complementary materials such as tutoring books…" (SchBToMusic)

This teacher commented on the use of student reaction and learning outcomes for teachers to self-evaluate and adjust their teaching behaviours to student learning. For example, this teacher mentioned that

> "… Teachers need to evaluate themselves through students and adjust their planning and behaviours based on student reaction. Student learning outcomes should be perceived as the standards for teachers…" (SchAToHistory)

Also, teachers' selection of teaching resources is based on student learning. For example, this teacher mentioned how resources were selected and used on the basis of student needs:

> "If you are a frontline teacher, you may know how to select resources that are useful…In terms of resources choice, we make a decision based on needs, student learning needs as well as the needs of the teachers in that particular content area…" (SchAToEnglish)

Similarly, another teacher pointed out that it was very important for teachers to select resources based on student learning. For instance,

> "If you think that (resource) is good, then you use it. If not, you don't use. You need to make changes on your own. Sometimes when we make our own slides, we don't copy directly but revise it…We need to personalise it based on our students. So, we can't copy them all…" (SchAToHistory)

6.2.2.3 Formal and Informal Collaboration

Another key feature of the collaborative reflective enquiry in this study is formal and informal collaboration. In the research context of this study, teachers typically collaborate with one another by participating in school-based professional development activities such as Collective Lesson Planning organised by Teaching and Research Groups. This is a primary form of collaborative reflective enquiry and professional development practices in the three schools, which is relatively formal. For instance, this teacher stated as follows:

> "In our school, collaboration with other teachers is a must. We need to collaborate with other teachers through participating in Teaching and Research Groups activities, discussing about textbooks or curriculum standards and exchanging slides/lesson planning materials etc…We learn from each other through the above ways…" (SchCToMaths)

Majority of the teachers typically attend Teaching and Research Groups activities and collaborate with one another in a relatively formal manner. Similarly, this teacher mentioned how teachers typically collaborated with each other as follows:

> "…The Teaching and Research Groups organise collaborative activities, such as group discussions on teaching and learning and/or team meetings. Issues can be raised during these collaborative activities…Experienced teachers usually present their ideas in the first place when attending Teaching and Research Groups meetings. Then other

> teachers ask questions during the meetings, particularly when they feel that they have issues or concerns to be raised. This is a form of research into teaching…There are also cross-year-group meetings…Teachers from other year groups can come and listen to our public demonstration lectures, giving feedback on the lectures…" (SchAToEnglish)

Likewise, this teacher mentioned that teachers worked with each other in different ways:

> "We have got all (ways of collaboration), such as attending team meetings, exchanging teaching materials, engaging in discussions about teaching and learning…We also do cross-year-group activities…Teachers across different year groups always plan lessons together. We can work with each other either within the same year group or across different year groups…" (SchAToHistory)

However, despite the formal collaborative reflective enquiry practices of this study, there are some informal collaborative activities between teachers across three schools. For instance, this teacher commented on informal collaboration as follows:

> "…Activities in Collective Lesson Planning meetings are relatively formal. Teachers also do informal activities by having discussions about their teaching…" (SchAToHistory)

This teacher mentioned informal collaboration as follows:

> "…For example, if we meet the teachers of the same subject with me in the office, sometimes two or three teachers, we will discuss difficult issues arising from classroom teaching or student homework and seek to find out a better approach to addressing these issues…Occasionally when we are off work, we will chat to each other on our way home…" (SchAToChemistry)

This teacher described how teachers shared teaching resources via Chinese social media platforms informally:

> "…We have got WeChat and QQ groups in our subject areas. We have set up Teaching and Research Groups in the subjects of Chinese and Maths etc. (on social media platforms). We share articles within these groups based on good teaching experiences, teaching materials and/or slides. We learn from each other for improvement, enquiring together…" (SchCToChinese)

Similarly, this teacher mentioned that teachers sometimes chatted to each other informally for exchanging teaching materials:

> "…We always share what we have prepared with other teachers. For example, in terms of the exam questions shared with students, we usually ask other teachers whether they might need them. If they do, we will prepare extra copies for them when printing out or photocopying the materials…" (SchBToMaths)

6.2.2.4 Collaborative and Individual Reflection

Collaborative and individual reflection is a key feature of teachers' collaborative reflective enquiry practices in this study, as it can significantly facilitate teachers' authentic professional learning, potentially leading to changed teaching beliefs and practices. In this study, teachers reflect collaboratively on their teaching practices in team meetings and/or group activities for enhancing teaching and learning. Indeed, authentic professional learning is essentially a self-reflective process for teachers to think deeply about their teaching practices and student learning. This self-reflective process needs to be facilitated by teachers' reflection. For example, this quote can provide an example to illustrate how teachers have reflected collaboratively on exam results and teaching practices in general:

> "…We reflect collaboratively…All History teachers across three Year Groups get together to discuss…particularly after exams, we analyse exam results together, then we reflect on our teaching, especially on areas that need to be improved…We learn from each other's experience and adopt pedagogical approaches that are innovative and suitable for the Curriculum Reform…" (SchAToHistory)

This quote demonstrates how teachers have reflected on teaching practices based on colleagues' critiques:

> "…Teachers need to make use of the critiques from others, particularly from colleagues to evaluate their own teaching practices objectively. In doing so, the reflection could be more effective. Sometimes colleagues may see issues more clearly as a third party. Therefore, I personally think we should welcome critiques from our colleagues…" (SchAToHistory)

However, teachers' responses also indicate their individual reflection on different aspects of teaching. As mentioned in Chapter 3 Literature Review, reflection can happen in, on and for actions, and it is therefore an element which combines both collaborative and individual

reflection. Collaborative reflection for actions essentially needs to build upon teachers' individual reflection in, on and for teaching and learning. For example, this teacher gave a specific example of what reflection *in* actions was like:

> "…usually in our school one teacher teaches two classes. When you finish one session, you will need to reflect on what hasn't been delivered clearly. You will need to understand what the problem is. Then you adjust within a few minutes and try to deliver in the second class… Also, we reflect together after exams. If the same problem remains in both classes I teach, this means that there must be something that hasn't been delivered. Then I will need to clarify further…" (SchBToMaths)

Similarly, this teacher mentioned that teachers reflected *on* different aspects of their teaching practices in relation to lesson planning and pedagogical approaches:

> "We definitely reflect. We reflect on our teaching, the teaching design of each lesson. We also reflect on the overall design and pedagogical approaches after the teaching sessions. Apart from that, we also reflect on class and student management. We do all sorts of reflection…" (SchBToMaths)

This quote demonstrates the importance of reflection *on* classroom teaching as follows:

> "…No matter whether that lesson is well-taught or not, I will always need to think and reflect. If the lesson is well-taught, I will put down some notes regarding the strengths in things like teacher-student relationship, classroom climate, student understanding, or the use of a teaching approach that may be different from my previous one in order to stimulate student learning interests. Of course, there will be circumstances where my teaching approach doesn't work well during classroom teaching…" (SchAToChemistry)

This teacher mentioned that teachers also reflected *on* their pedagogical approaches by watching recorded videos of other teachers' lessons. For example,

> "…Since the ICT develops, we can also see how other teachers teach via recorded videos and then reflect on our own teaching for improvements that could be made. We reflect on pedagogical approaches regarding how to improve our pedagogical approaches or how to advance our teaching philosophy…" (SchBToChinese)

This teacher commented on teachers' reflection *on* student homework as follows:

> "…We need to reflect on students' homework. If we think the curriculum is well-delivered, why do students still have problems in completing their homework? Even if the curriculum was delivered, why didn't all students understand the key issues covered…We generally reflect upon issues regarding teaching practices, pedagogy and/or other relevant aspects. We need to be reflective. This is essential…" (SchAToEnglish)

Most importantly, teachers' collaborative reflective enquiry practices in this study as mentioned before are teaching/curriculum-focused. Thus, the utmost goal of teachers' reflection is to improve classroom teaching for enhancing student learning. For instance, this quote can indicate what reflection *for* actions is like:

> "…We reflect on each one of the lessons we teach. We think about whether there are some areas for improvements after the lessons. Although I used to teach using this pedagogical approach, why is it not as effective as it was before when it comes to this cohort of students? The pedagogical approaches don't necessarily work as always when we teach different students…" (SchAToEnglish)

In particular, this teacher described that reflection related to different aspects of teaching and learning was required for syllabus preparation, and had been formalised as part of an administrative procedure:

> "In terms of reflection, teachers are required to reflect on their teaching when preparing for syllabus. At the end of the syllabus planning form, there is a section called reflection regarding what you have learnt after this session and/or what improvements could be made (for future sessions) …Teachers of different subjects are required to reflect on exams. The reflection tables are collated by the Teaching Affairs Office. Teachers are asked to analyse all exams carefully, such as what knowledge points they have done well or haven't done that well. How difficult that question might be? What are the percentages of all grades, in terms of passing rates, top grade rates, or failing rates. All these information needs to be reflected on the tables submitted to the Teaching Affairs Office. Then the tables will be archived by the Teaching Affairs Office…" (SchCToChinese)

6.2.2.5 Use of Evidence (Exam Results, Student Homework, Teacher Experience and External Expertise) and Academic Research

When teachers enquire about and reflect on teaching practices and student learning collaboratively, they usually form judgements based on evidence. This evidence in the three schools is typically related to student exam results and homework as well as teacher

experience, despite some evidence based on academic research. For example, this teacher provided a good example of using evidence relating to student exam results as follows:

> "…For instance, we have got two to three exams every month. Each one of the Year Groups will take the lead to organise (meetings) on a monthly basis. We have three Year Groups in total. Before the exams, the Year Groups will host Teaching and Research Groups meetings to decide on the scope of the knowledge points for exams...after the exams, meetings will be held to analyse exam results regarding teaching quality…Based on the exam result analysis of all Year Groups, both the strengths and weaknesses of pedagogical approaches will be analysed. If students don't perform well in exams, teachers will need to reflect on their own practices for improvement…" (SchCToChinese)

Similarly, this teacher gave a brief comment on the analysis of student exam results:

> "We (teachers) do this through analysing student exam results in the mid-term test. We examine the extent to which students learn by analysing their exam papers. This is something organised by the school… In doing so we can understand how well students have learnt…" (SchAToChemistry)

Likewise, this teacher described in detail the process of analysing information related to student performance and exam results as follows:

> "We usually print out all the information of the class we teach on a big paper. We then analyse the information. For example, we analyse the information regarding which exam questions students have/haven't done well. Sometimes teachers print out all the information about one student, and look at whether that student has done well in the first exam, in the second exam or in the third exam. They usually put the information on the notice board, making it publicly available…Usually we have got four exams in one term, and students can reflect on their own progress. Sometimes teachers analyse more information in one subject in comparison to another. Basically, teachers analyse information on a weekly basis..." (SchBToChinese)

Similarly, this teacher stated very strongly that analysis of student exam results was a key focus of their evidence use as follows:

> "The focus is definitely on analysing student exam results...Based on different subject areas, teachers need to understand what students have understood well, and in which areas students need to make more progress…" (SchCToMaths)

It is clear that teachers in the three schools focus heavily on the evidence of student exam results for evidence-informed decisions on improving their pedagogical approaches and teaching practices. In addition, teachers also focus on other evidence such as student homework, teacher experience and some external expertise. For instance, this teacher mentioned that they analysed student homework for reflection on student learning:

> "…We usually analyse student learning by looking at student homework…We think about the kinds of homework students in set A need, and those for students in set B? We come up with a homework plan…" (SchBToICT)

This teacher commented on teachers' engagement in some publications based on teacher experience, indicating a purpose of publishing papers for job promotion:

> "...Usually, the academic papers we write are based on teacher experience…If teachers publish academic papers, they usually do that for the purpose of promotion, and write papers more based on experience…" (SchBToEnglish)

Another teacher mentioned that ideas from experts in teachers' professional training were useful in informing their enquiry practices:

> "…sometimes we apply the ideas from external experts into our own practice for guiding enquiry about student learning…" (SchCToMaths)

Indeed, engagement in academic research in China has been relevant to teachers' professional work and lives, as publishing academic articles is to some extent associated with teachers' professional title and career progression. Hence, those teachers aiming to climb to a higher rank in their professional career usually need to publish some academic articles for evaluation. However, due to the limited subject knowledge of rural Chinese teachers and their limited ability in carrying out academic research, the publications are typically experience/opinion-based, being less scientific and rigorous. Nevertheless, in terms of teachers' use of academic research indicated in the survey, teachers generally agree on the importance of engagement in academic research for informing their pedagogical approaches and teaching practices. Yet, it seems that the results of the interviews in this regard are mixed.

For example, this teacher had a quite positive attitude towards teachers' research engagement in the School:

> "…There are many research projects going on in the School…For example, we are working on a project related to 'thorough reading' (reading across the whole passage). This is a mini project of a Province-level project. Many teachers in my school have participated in this research, and aim to address the ways of improving students' Chinese reading and writing…Teachers are relatively willing to participate in this. This may be partly because there are some policy incentives to facilitate participation. Teachers think that undertaking research could potentially improve their teaching…Personally, I think it may also benefit our job promotion…" (SchCToChinese)

This teacher used a small-scale research project as an example to illustrate how the evidence of academic research was used to stimulate students' learning interests for improving teaching practices:

> "…For example, we have just finished a small research project regarding how to get students engaged in the first five minutes of a formal Chinese lesson through music and poetry…Throughout the participation process, we thought about different ways of stimulating students' interests…" (SchBToChinese)

However, some teachers are not positive about their research engagement. For instance, this teacher mentioned that:

> "…We need to take part in research projects. This can demonstrate our ability in improving student outcomes. However, we don't undertake research projects that much, which is weak in our school, and neither do academic papers…" (SchBToEnglish)

6.2.2.6 Iterative Process of Enquiry

Another feature of teachers' collaborative reflective enquiry practices in the three schools is characterised by an iterative process of enquiry. This feature demonstrates the significance of promoting collaborative reflective enquiry over time as a continuous and iterative process. Teachers continuously enquire about teaching and learning for potential changes in their teaching beliefs and practices. For example, this teacher pointed out that:

> "…The Collective Lesson Planning activities for teachers of Chinese and English are scheduled on every Monday Afternoon. The activities for other teachers are on every Tuesday Morning. The primary focus of the Planning is on lessons to be taught in that week. We also review what has been taught and discuss with one another…" (SchAToEnglish)

Similarly, another teacher stated that teachers all attended weekly meetings for mutual learning. For instance,

> "…With regards to team meetings, on each Monday we have a weekly meeting where all teachers of the same subjects gather. We collect all materials relevant to our teaching…We learn from experienced teachers…" (SchBToMusic)

This teacher pointed out that the collaborative reflective enquiry practices were long-term, school-wide and Teaching-Research-Groups-specific as follows:

> "As I mentioned earlier, all Teaching and Research Groups undertake enquiry practices. For instance, we often enquire collaboratively about improving our pedagogical approaches or teaching methods, including teachers of PE, Music, Biology and Geography…In our school, there are Teaching and Research Groups meetings per term. Teachers who teach the same subject will enquire collaboratively to improve the teaching quality of the subject. So, the enquiry is long-term, school-wide and Teaching-Research-Groups-specific" (SchCToChinese)

6.2.2.7 Leadership support

Leadership support is one important feature of collaborative reflective enquiry practices in the three schools. For example, this teacher mentioned that their Collection Lesson Planning activities were promoted and supported by the Senior Management Team as follows:

> "…The Senior Management Team in the school has been promoting Collective Lesson Planning. Each week two hours (around two sessions) will be allocated to Collective Lesson Planning focused on the following two aspects…Issues related to the curriculum content in the forthcoming week will be addressed in terms of key teaching tasks and difficult content as well as the skills for the delivery. For each one of the planning meetings, one teacher will take the lead and present what has been prepared for the teaching sessions, and other teachers will provide their feedback accordingly, comment on the strengths of the planning and discuss the weaknesses...In doing so, teachers are enquiring collaboratively (about their teaching) …" (SchBToICT)

This teacher mentioned that the School Leadership Teams focused on teaching quality, which was reflected in their analysis of student performance data as follows:

> "…Usually there are more group activities in the subjects of Chinese and English…but our school has a strong focus on teaching quality…Therefore, after each exam, the Office of Teaching Affairs will first analyse students' exam results of all classes respectively and then hand out these results to all Class Supervisors and subject teachers. Then the Class Supervisors and subject teachers will discuss with each other and analyse the results together, focusing especially on low-achievers…" (SchAToCheministry)

Teachers also mentioned that all Teaching and Research Groups had Heads who took responsibilities in improving teaching and learning, which could be demonstrated by the ways of supporting teachers in resources sharing via social media platforms. For example, this teacher mentioned that:

> "…All subjects (in my school) have Heads of Teaching and Research Groups. The Heads have the duty and responsibility to improve the teaching quality of their own subjects…The Heads have set up WeChat groups for all teachers to share useful teaching resources, although this is not mandatory…" (SchCToChinese)

6.2.3 Perceived Benefits: Enhancing Teachers' Mutual Learning and Reflective Thinking, Improving Teaching Practices, and Strengthening Their Capacity Building

In term of the perceived benefits of collaborative reflective enquiry, teachers consider that collaborative reflective enquiry can enhance teachers' mutual learning and reflective thinking, improve teaching practices, and strengthen their capacity building. Consequently, teachers can have the opportunity to try out new ideas about classroom teaching and adopt pedagogical approaches that could potentially promote student engagement, active thinking, independent learning and all-round development. For example, this teacher mentioned that collaborative reflective enquiry was beneficial for teachers to share their thinking, experience and subject knowledge, contributing to improvements of teaching practices. For example,

> "…I think collaborative reflective enquiry can enable teachers to share their thinking, experience and subject knowledge... It is more about sharing and making progress harmoniously…Teachers can get actively engaged in class, share their subject knowledge with students …" (SchAToHistory)

This teacher mentioned that collaborative reflective enquiry was considered to benefit teachers on improving their teaching practices and especially professional skills as follows:

> "If teachers are in the same Teaching and Research Groups, the Collective Lesson Planning for them is a form of collaborative reflective enquiry for teachers… as I mentioned earlier, teachers plan the lesson together, share their own ideas about that lesson and reach a mutual agreement in Teaching and Research Groups meetings. This is something that can really benefit teachers' teaching and help improve teachers' professional skills…" (SchCToChinese)

Similarly, this teacher mentioned that collaborative reflective enquiry practices could enable a better understanding of teachers on the delivery of the curriculum for strengthening their professional capacity:

> "If we talk about the benefits from teachers' point of view, collaborative reflective enquiry requires teachers to dig deep about textbooks in order to prepare good questions for their teaching. In doing so, teachers may deliver the curriculum better. This is definitely beneficial for teachers' capacity..." (SchBToICT)

6.2.4 Challenges: A Lack of Genuine Collegiality, Superficial Reflection, Less Active Engagement in Academic Research, and Preference for Conventional Teaching Practices

Generally, teachers' responses towards the challenges for their collaborative reflective enquiry practices in this study are related to a lack of genuine collegiality, superficial reflection, less active engagement in academic research, and preference for conventional teaching practices. Especially in terms of use of research and evidence, although teachers are generally aware of the importance of academic research, not many have reported active engagement in academic research and/or research projects. Teachers also use more evidence relating to exam results, student homework and teacher experience. Most importantly, given that these teachers in rural China have been traditionally employing a teacher-centred

pedagogical approach, the iterative process of enquiry seems to strengthen teachers' professional capacity in teaching to the test, without facilitating new changes to their teaching beliefs and practices (e.g. student-centred pedagogy and broader student learning outcomes). This argument has been identified as a key challenge for teachers' collaborative reflective enquiry and professional development practices. It highlights an urgent need for finding ways through collaborative reflective enquiry and professional development to stimulate new ideas about teachers' beliefs and attitudes towards employing new pedagogical approaches to unfreezing outdated practices.

6.2.4.1 A Lack of Genuine Collegiality

Structural, formal and top-down collaboration between teachers may have promoted more formality and yet discouraged teachers' "genuine collegiality" in teacher collaboration. For example, this teacher mentioned less genuine and active engagement of some teachers in collaboration and lesson planning as follows:

> "…In terms of genuine attitude to collaboration, initially teachers only came due to school regulations, but now I would say that most teachers have actively participated in this. It has been a changing process. However, there are cases where teachers are physically here (for the lesson planning) but mentally less engaged…" (SchBToICT)

This teacher commented on collaboration that the reluctance to collaboration remained for some teachers, although usually teachers did collaborate with each other:

> "Usually most of the teachers (in our school) are willing to collaborate with one another, but some teachers may still be reluctant to this…younger teachers are engaged in lesson planning but since older teachers have had experience already, some of them may be a bit (less engaged) …" (SchAToEnglish)

A lack of genuine collegiality therefore may cause superficial communication between teachers, making teachers less engaged. For instance, this teacher mentioned that:

> "…The area that needs to be improved is the collaboration and communication between teachers. Sometimes, the communication is superficial and may need to be enhanced…Some teachers are not that well-prepared…and feel that there is not much

difference in their teaching between one another no matter how well they teach…" (SchCToMaths)

Also, this teacher pointed out that the collaboration was superficial:

"...sometimes when planning lessons, teachers are superficial, without getting prepared for lesson design or conducting research on textbooks or exam guidelines...They may just download slides online and make simple changes...Also some of them may not be happy to share what they have prepared..." (SchBToChinese)

6.2.4.2 Superficial Reflection

Moreover, teachers' responses towards the challenges for their collaborative reflective enquiry practices also focus on superficial reflection. For instance, this teacher stated that teachers' reflection on teaching practices was superficial, and few teachers reflected deeply on teaching and learning as follows:

"…It (reflection) needs to be strengthened. This is because most of the teachers reflect on their practice superficially. Few of them think deeply about their teaching. If teachers can reflect on their practice in depth, they are usually excellent teachers. However, only few of them are that good, aren't they…" (SchAToEnglish)

This teacher questioned the depth of teacher's reflection as follows:

"…Overall, I think some teachers only reflect based on personal experience. Their reflection may lack depth from my personal point of view. I am not sure whether teachers can reflect very deeply on their practice…" (SchAToHistory)

Similarly, this teacher mentioned that not many teachers were reflective:

"…Reflective teachers usually write something for reflection quite often but not many teachers are doing this. Majority of the teachers in our school don't reflect spontaneously...It depends upon whether the teacher would be willing to promote his/her professional growth and improvement…" (SchBToEnglish)

This teacher commented on reflection that some teachers only reflected on teaching practices for administrative purposes:

> "…It is necessary to enhance the depth of the reflection…however, some practices can be superficial. For instance, writing about reflection is required by the school, but teachers are doing this only for the purpose of completing the task..." (SchCToMaths)

Likewise, this teacher admitted that reflection was not mandatory, depending on personal willingness.

> "…To be honest, I am not that reflective...unlike other subject teachers who usually talk to each other face to face, we don't need to do this mandatorily, so it's hard to say…" (SchBToMusic)

6.2.4.3 Less Active Engagement in Academic Research

As mentioned before, teachers in this study seem generally positive about the use of academic research in informing their practices. However, not many teachers have been actively engaged in academic research for their collaborative reflective enquiry practices, despite their acknowledgement of the importance of research engagement. For example, this teacher pointed out the nature of teaching as a form of professional practice and argued for the support of theoretical guidance in improving their teaching practices.

> "…I think we still need theory of change. After all, teaching is a specific form of practice (teaching practices), but there is relatively a lack of theoretical guidance. Theory of change can assist us in assessing our 'hunch' in teaching in order to help us gain a better understanding of our behaviours and thoughts. The theory of change can facilitate more alternatives for our practice and strengthen our theoretical foundations which can in turn enable us to articulate our personal behaviours...Hence, teachers can assess our own thoughts and behaviours from a broader perspective...However, I have to say the theoretical guidance lacks in our daily practice…" (SchAToHistory)

However, in reality, research engagement may be challenged by factors relating to teachers' workload, limited time and disinterest in academic research. For instance, this teacher stated as follows:

> "…I have been asked to undertake some research projects, but I haven't done any…this is because I have been working as a Class Supervisor, managing all my students, and usually I have got teaching commitments of two classes. Also, I have to attend training

courses organised by authorities at County and City levels…and most importantly, I am personally not that interested in academic research…" (SchAToEnglish)

Similarly, this teacher also mentioned the lack of time for research engagement as follows:

"…Teachers may not have the time to engage in research projects, as teachers have heavy workload and it is difficult for them to think about research engagement. Also, engaging research projects challenges teachers' knowledge and may require teachers to learn something new. Some teachers are not willing to do so, viewing it a bit tiring…" (SchBToEnglish)

6.2.4.4 Preference for Conventional Teaching Practices

It is mentioned that some teachers have the tendency to employ a traditional pedagogical approach and have preference for conventional teaching practices. Such preference may challenge the quality and effectiveness of teachers' collaborative reflective enquiry practices for adopting new pedagogical approaches. If teachers participate in collaborative reflective enquiry practices only following conventional philosophy of education, it may be difficult for teachers to change their existing teaching beliefs and practices on student learning. For example, this teacher mentioned as follows:

"…In places such as Western China, teachers are used to cramming. Teachers teach in the front of the classroom, and students just listen…Teachers are still used to a more traditional teaching approach…" (SchAToEnglish)

Similarly, this teacher mentioned the difficulty for teachers to change their beliefs as follows:

"…In practice, it really depends on teachers, as some teachers have been using the same approaches for decades. It may be a bit difficult for them to update and innovate. Therefore, the effectiveness of such participation is not obvious…" (SchCToEnglish)

This teacher explained the tensions between the new curriculum reform and the traditional pedagogical approach associated with knowledge-based transmission as follows:

"…Talking about the new curriculum reform, usually we all accept the new philosophy but sometimes we feel it might be a bit superficial, only for a lively classroom climate on the surface. It really depends on how teachers deliver in practice. If teachers only

look for a good classroom climate, students could potentially be more engaged, and the classroom climate could be livelier. However, students might not obtain knowledge as they could, in comparison to the traditional pedagogical approach. So, we need to accept it critically. We can't only seek a lively classroom climate blindly. Instead, we need to not only engage students in a lively classroom climate but also assess the extent to which students can learn, whether they can obtain knowledge…" (SchAToHistory)

This teacher commented on the quality of collaborative reflective enquiry practices as follows:

"…Some teachers are not serious about the activities of Teaching and Research Groups. They are not that willing to participate in such activities…This is probably why the quality of teachers' research into teaching is not obvious…" (SchBToEnglish)

6.3 RQ3. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Strategies That Could Improve Their Collaborative Reflective Enquiry Practices?

The findings of the interviews have shown that collaborative reflective enquiry practices in the three schools could be enhanced potentially via the following strategies. For instance, more supporting structures and/or mechanisms could be provided regarding more external training opportunities and funding, informal and genuine teacher-to-teacher collaboration, school-to-school collaboration for external expertise, research engagement, and mentoring and coaching. Teachers' participation in collaborative reflective enquiry and professional development could be incentivised and linked to teachers' job title and pay. Most importantly, teachers' commitment could be enhanced to develop their passion towards teaching as a profession.

6.3.1 Providing Teachers with More External Training Opportunities and Funding

As mentioned in the section of the challenges for teachers' collaborative reflective enquiry practices, teachers' participation in collaborative reflective enquiry seems to iteratively enhance their professional knowledge and skills in employing a teacher-centred approach to teaching to the test. Therefore, a key driver for improving teachers' collaborative reflective enquiry in the three schools is to stimulate new ideas about their beliefs and practices by

providing more external training opportunities, alongside funding and other financial support. In doing so, teachers could have better opportunities of exposure to more effective teaching approaches and practices outside of their own schools. New ideas of teaching and learning could be facilitated for teachers to improve their collaborative reflective enquiry practices relating to research into teaching and learning. For example, this teacher stated that there was a need to provide teachers with more external training opportunities as follows:

> "…We need to encourage our teachers to go out for training. Statistically, half of our teachers have been teaching for decades in the School but have never listened to the lessons of other teachers outside of the school…" (SchBToEnglish)

This teacher explained further that some external training only targeted core subject teachers of Chinese, Maths and English, and the training focused more on classroom management skills instead of subject knowledge and teaching skills:

> "…We need external training. For example, in Chemistry department, few Chemistry teachers have received external training. Most of the training provided by external providers is focused on the management skills of class supervisors, and of course on the training of core subject teachers (Chinese, Maths and English)…" (SchAToChemistry)

Also, teachers have been honest about the funding challenges. This is probably an issue across many rural schools in China that funding has been a constraint for further larger-scale off-site teacher professional development for rural Chinese teachers. For example, this teacher highlighted the need for providing more funding for teachers' professional development as follows:

> "If teachers need to go out for training, funding is an issue…In our school the funding is limited, and few teachers can go to other schools for training. Subsequently, the School only considers sending one or two teachers. Why not more teachers? This is probably because the training expenses are high and yet free training opportunities provided by the LEAs are limited. This is the reason why we need to pay for the opportunities provided by external organisations, depending upon the total number of teachers for training. For example, it may cost hundreds of Chinese Yuan per person. Apart from that, we need to pay for accommodation, transport etc…" (SchBToEnglish)

6.3.2 Encouraging More Informal and Genuine Teacher-to-Teacher Collaboration, Promoting School-to-School Collaboration for External Expertise, Supporting Research Engagement, and Maintaining Mentoring and Coaching

Crucially, there is a need to encourage more informal and genuine teacher-to-teacher collaboration, promote school-to-school collaboration for external expertise, support research engagement and maintain mentoring and coaching. In terms of teacher-to-teacher collaboration, it seems that existing collaborative reflective enquiry practices are characterised by its structural and formal collaboration. Some teachers may only take it as an administrative task for formality. This has to some extent stifled more genuine collaboration between teachers, indicating a need for informal and genuine collaboration in the three schools. For example, this teacher indicated a need for encouraging genuine teacher collaboration further:

> "…There is a need to enhance genuine teacher collaboration…I think teachers should have the awareness of working with colleagues, and teachers need to advance their teaching philosophy and change their pedagogical approaches…This is because traditionally teachers have only worked on their own and haven't really learned from each other…Also, teachers should listen to more model lessons and enhance their understanding of theories…" (SchCToMaths)

Also, another reason for encouraging more genuine teacher collaboration is that individual teachers' performances are related to the evaluation of the whole school. Therefore, more genuine teacher collaboration could potentially improve teachers' individual performances and consequently the whole school's performance. For example, this teacher explained that:

> "…This is because the school plan now is to compete with other schools (in the same region) as a whole. When one of the Year Groups is assessed, the whole school that Year Group belongs to will be considered. For instance, if we take the subject of Chinese as an example, we will look at the student exam results of all teachers of Chinese as a whole, rather than individual teachers…" (SchBToChinese)

Moreover, teachers have mentioned that working with other schools for lesson planning and relevant collaborative reflective enquiry practices could be useful for mutual learning. Given that advancing teachers' philosophy of education, and stimulating new ideas about their

beliefs and practices in the same school may be limited and challenging, it would be very helpful for schools to collaborate with one another to share new ideas of teaching and learning as well as teaching resources so as to improve teacher and student learning. This may be particularly important for low-performing schools to learn from high-performing schools for "external expertise". In doing so, the overall capacity of low-performing schools could potentially be strengthened. For instance, this teacher provided a very good example to illustrate a need for promoting school-to-school collaboration as follows:

> "…We could work collaboratively with other schools around us (e.g. sister schools in another administrative region) to do observations or lesson planning. Our teachers could go to School A for lesson planning, and teachers in School B could come to our school to do public lectures. This could be a very good way of communication between the two schools. Comparatively, the academic abilities of students in the schools around us are not that different, and the schools have been performing academically almost at the same level. Therefore, the pedagogical approaches are relatively similar. In this case the mutual learning across schools could be more effective…In addition, I think teachers who teach the same cohort of students need to come together, listen to public lessons and give feedback to each other…" (SchBToChinese)

As mentioned earlier, providing teachers with external training opportunities and expertise can be a key driver for new changes to teaching and learning practices in rural China. For example, this teacher highlighted from the perspective of the Senior Management Team that it was crucial for teachers to seek ideological changes through mutual learning across schools as follows:

> "…We encourage teachers to reach out for training and at the same time welcome other teachers to our school for staff training. This is because the key to change is the change of our ideologies and thoughts…Once teachers go out to see how other teachers teach and/or to observe how other teachers coming in to the School teach, they will understand the differences between themselves and other teachers, and the difference may strike our teachers…" (SchBToEnglish)

Besides, further support is needed for teachers' engagement in academic research and/or research projects for their professional capacity building. Despite some teachers' engagement in research projects in this study, further attention could be given to teachers' research engagement and evidence use, in terms of both policy and practice, in order to

support and inform teachers' selection of pedagogical approaches. For example, this teacher mentioned as follows:

> "The ability to undertake research projects or publish is fundamental. Sometimes, teachers stand out due to their publications and/or projects of scientific innovation…usually teachers of Science subjects are more competitive in applying for scientific innovation projects…" (SchAToHistory)

In addition, mentoring and coaching has been identified as a key strength of teachers' professional development and learning across the three schools. This can be evidenced by the survey findings in Chapter 5 that mentoring and coaching is considered to have the largest impact on teachers' professional development as teachers. Therefore, it is important to build on and maintain teachers' strength in their participation in mentoring and coaching for their professional development, particularly for newly qualified teachers. For example, this teacher mentioned as follows:

> "…In this respect, requirements have been specified in relevant policy documents. For instance, the School shall encourage all teachers to attend Teaching and Research Groups meetings and enquire about teaching practices. In our school, there is a strong focus on training for new teachers. Usually when a new teacher comes to the school, a *shi fu* (Master) will be allocated. They pair with each other, with experienced teachers coaching new ones. For example, we had ten new teachers last year, and each one of these teachers was allocated with a *shi fu* of their own subjects…We also issued certificates to these experienced teachers (for acknowledging their contribution) …" (SchCToChinese)

6.3.3 Incentivising Teachers' Participation in Collaborative Reflective Enquiry and Professional Development and Linking It to Teachers' Job Title and Pay

Incentive-based approach to teachers' professional development has been identified as a key strategy internationally, and this approach can potentially promote teacher' motivation and commitment. Using a strategy that is incentive-based could be particularly relevant to a resource-constrained context of rural China as discussed in this study. Therefore, in order to promote teachers' participation in collaborative reflective enquiry and professional development practices, it could be useful to provide teachers with more incentives and link them to teachers' job title and pay. For instance, this teacher mentioned the link of teachers'

participation in collaborative reflective enquiry and professional development practices to their job titles, indicating a need for some evaluative mechanisms:

> "…As we mentioned earlier, it would be better to have evaluative mechanisms…Given the Chinese characteristics of the education system, teachers need to be evaluated. It should be linked to teachers' job title and/or career progression…" (SchAToEnglish)

Job promotion seems to be a primary concern for teachers in this study. Thus, it could be useful to incentivise teachers' participation in collaborative reflective enquiry by focusing on teachers' job titles and career progression. If the participation was linked to their job titles and promotion, teachers would feel more motivated in their collaborative reflective enquiry and professional development practices. For example, this teacher mentioned as follows:

> "Regarding the job title system in China, many teachers have been working for decades, but they haven't got promoted to a higher rank. Therefore, some teachers have become less engaged in professional development…There is competition between teachers. If teachers are considered for career progression, they will be compared with one another in their performance…" (SchAToHistory)

The issues of material and resources have been considered important for teacher development and school improvement in developing countries such as China. Therefore, providing more incentives relating to teachers' pay could be of great importance. For example, this teacher stated that teachers' pay was another concern, and may influence their commitment and attitudes towards professional development and teaching practices.

> "In terms of teacher commitment, there is a need to increase teachers' pay in a place like our school. This is because we stay in a small place and teachers often compare with each other. They would assume that some other teachers are supposed to do better than them if those teachers could get higher pay. This is why teachers usually compare with each other in their pay rather than their professional competency. So, this needs to be improved. We require teachers to do well but at the same time we need to increase teachers' pay. In doing so, teachers would feel that they are getting more incentives…" (SchBToEnglish)

Similarly, another teacher also mentioned that financial incentives such as performance-based pay were important for teachers' motivation and commitment as follows:

> "As I mentioned earlier, financial incentives (e.g. performance-based pay) are another issue. To a large extent, teachers who teach well have got almost the same financial incentives with those who don't teach well. There is not much a difference… However, there might be a huge difference in teachers' financial incentives in Cities A and/or B, particularly between experienced and young teachers…" (SchBToChinese)

6.3.4 Enhancing Teachers' Commitment and Passion towards Teaching as a Profession

All in all, it seems that there is a pressing need to promote rural teachers' commitment, and develop their passion towards teaching as a profession for improvements in the quality of teaching and learning. As mentioned earlier, authentic professional learning can only happen if teachers are committed to reflecting upon their professional practice, advancing their philosophy of education and adopting different pedagogical approaches. Therefore, it is crucial to promote teachers' commitment and enhance their understanding of education as a cause. For example, this teacher stated as follows:

> "…The key is to enrich teachers' thoughts on education and enable teachers to see education as a cause, thereby developing their passion towards education. In doing so, teachers are less likely to be distracted by things like low pay or teaching environment. Most of the time, it is more about teachers' understanding towards this profession…Simply speaking, teachers have to be very passionate about education…" (SchAToEnglish)

Relevant to the aspect of teacher commitment mentioned above, it is indicated by teachers that there is a further need to provide teachers with more physical and human resources, such as teaching facilities, and lab assistants for promoting teachers' commitment and supporting their collaborative reflective enquiry and professional development practices. Although the physical conditions of rural China are generally improving, a lack of physical and human resources has still been an issue that needs to be addressed further. For example, this teacher mentioned as follows:

> "…The teaching facilities are still lacking. For instance, the building for labs is under construction. There is no interior design in it, and yet our students are about to start their term very soon. We went to the building earlier today to search for something, but the labs were still in a mess…We need professional members of staff working in labs. It would be ideal that we could have one professional lab specialist to prepare all equipment for us, but we lack those professional people. Consequently, we need to

> prepare for the lab demonstrations ourselves. Imagine if we had many groups of students in one class, it would be hard to get well-prepared for all the students…" (SchAToChemistry)

Without enough resources, it would be challenging for teachers to adjust their pedagogical approaches to their classroom practices even if they could come up with new ideas about teaching and learning through collaborative reflective enquiry. For instance,

> "There is a need to provide modern teaching facilities, such as multi-media facilities. This is because only modern teaching facilities can support audio and video-assisted teaching. If teachers only have recorders, it would be unlikely for teachers to play videos, so the teaching facilities need to be up-to-date. ICT-assisted teaching is more engaging than the traditional approach, since the ICT-assisted classroom can stimulate students' senses differently. Otherwise I could only prepare supplementary materials and show them to students via screens…" (SchAToHistory)

6.4 Summary

To conclude, this chapter presents key themes and quotes regarding teachers' views of the concept, typical features, perceived benefits of collaborative reflective enquiry, and the challenges and strategies for their collaborative reflective enquiry practices, addressing RQs 2 and 3. The findings based on the interview analysis have indicated that the concept of collaborative reflective enquiry is understood as "to explore and research for improving teaching and learning". Teachers generally have a strong focus on "research" into teaching for adopting pedagogical approaches in their collaborative reflective enquiry practices of Collective Lesson Planning. The typical features of collaborative reflective enquiry are related to focus on teaching and curriculum, relevance to student learning, formal collaboration, collaborative and individual reflection, use of evidence (exam results, student homework, teacher experience) and academic research, iterative process of enquiry, and leadership support. Collaborative reflective enquiry can benefit teachers on their mutual learning and reflective thinking and has the potential to improve their teaching practices and strengthen capacity building.

However, there are challenges for teachers' collaborative reflective enquiry practices. Factors in relation to a lack of genuine collaboration, superficial reflection and less active engagement in academic research, and teachers' preference for conventional teaching practices are reported to be challenging for their collaborative reflective enquiry practices. Hence, the strategies that could improve teachers' collaborative reflective enquiry are also identified:

- Providing teachers with more external training opportunities and funding;
- Encouraging more informal and genuine teacher-to-teacher collaboration, promoting school-to-school collaboration for external expertise, supporting research engagement, and maintaining mentoring and coaching;
- Incentivising teachers' participation in collaborative reflective enquiry and professional development and linking it to teachers' job title and pay;
- Enhancing teachers' commitment and passion towards teaching as a profession.

Chapter 7 Discussion

7.1 Introduction

This chapter discusses and contrasts research findings of this study with previous local and international evidence reviewed in the literature review chapter. The chapter starts with a summary of key findings identified in this study and discusses these findings in the light of previous research relating to teacher professional development, PLCs and especially collaborative reflective enquiry. Subsequently, the chapter focuses on an overall discussion of the key findings regarding collaborative reflective enquiry, PLCs and professional development. It presents the core arguments that have arisen from these findings. This chapter seeks to present, demonstrate and discuss the substantive and original findings in comparison to previous research.

7.2 Summary of Key Findings

In this section, the findings of the survey will be reviewed first to address RQ1 regarding the nature and extent of teachers' reported engagement in professional development, PLCs and collaborative reflective enquiry in the three schools. More importantly, the findings of the semi-structured interviews will be discussed to address RQ2 in relation to the concept, typical features and perceived benefits of collaborative reflective enquiry, as well as the challenges. The findings of the interviews will also be reviewed to address RQ3 relating to the strategies that could improve teachers' collaborative reflective enquiry for their professional development practices.

7.2.1 Key Findings of RQ1. To What Extent Do Teachers in Three Secondary Schools of Rural Sichuan Province, China Report Engagement in Professional Development, PLCs and Collaborative Reflective Enquiry? Are There Any Differences in Teachers' Responses According to Factors of School and Teacher Experience?[14]

[14] The summary of key survey findings regarding teacher professional development, PLCs and collaborative reflective enquiry will be presented respectively in this section, but the focus is on collaborative reflective enquiry, which is towards the end of this section, i.e. the section of 7.2.1.3.

7.2.1.1 Teacher Professional Development: A Need for Promoting Individual or Collaborative Research and Qualification Programme

The findings of the survey regarding teachers' participation in professional development have shown that teachers in the three schools generally have reported frequent engagement in their professional development activities. A key argument arising from the findings is that more professional development opportunities in "individual or collaboration research" and "qualification programme" are needed to promote teachers' professional development in the three schools. This is because these two types of professional development activities are reported in this study to have the largest impact, and yet teachers have reported the lowest participation in both activities. For example, it has been reported that, during the last 18 months, teachers participated the most frequently in "courses/workshops", "mentoring and coaching", and "education conferences or seminars". However, teachers reported the lowest participation in "qualification programme", "individual or collaborative research" and "observation visits to other schools". This indicates a need for LEAs and school leaders to promote the provision of professional development in qualification programme, individual or collaborative research, and observation visits to other schools. This finding is in line with the findings of the ITDEQC project regarding teacher professional development in China that teachers have reported the lowest participation in qualification programme and individual or collaborative research (Thomas et al., 2013). Furthermore, the professional development activities of "mentoring and coaching", "individual or collaborative research", and "qualification programme" have been considered to have the largest impact on teachers' professional development. However, teachers have considered that the activities of "participation in a network of teachers", "courses/workshop" and "education conferences or seminars" have the least impact. This suggests that the provision of teacher professional development needs to focus more on mentoring and coaching, individual or collaborative research, and qualification programme.

Therefore, it can be argued, based on the survey findings of this study, that there is a need to promote professional development activities of individual or collaborative research, and qualification programme in the three schools. LEAs and school leaders need to better promote teachers' individual or collaborative research. Individual or collaborative research is closely linked to the focus of this study on collaborative reflective enquiry as a useful

approach to teachers' professional development in China. Evidence in China has shown that the value of teacher research, together with cross-cultural collaboration, has been demonstrated through PLCs in an international collaborative research and development project (Ryan, Kang, Mitchell, & Erickson, 2009). Promoting individual or collaborative research is in line with the international evidence that being research engaged is likely to have a positive impact on student learning outcomes (Furlong et al., 2014). Undertaking individual or collaborative research could potentially enhance teachers' professional capacity in enquiry and reflection (Furlong et al., 2014; J. Nelson & O'Beirne, 2014; Stoll et al., 2012). Besides, there is a need for LEAs and school leaders to encourage and support the teachers in the three schools to advance their qualifications. Evidence in China has shown that teacher qualification is positively associated with teachers' perceptions of PLCs and professional development practices (Ding et al., 2011; Ho et al., 2016), and can affect student achievement (Adams, 2012; Chu et al., 2015). This finding on qualifications is also related to the evidence in the international literature that teachers' certification status and degree levels can affect teacher effectiveness (Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005). Certified teachers can consistently produce stronger student achievement than uncertified teachers (Darling-Hammond et al., 2005).

Moreover, the findings of the survey in this study have shown that, although teachers have reported the highest participation in "courses/workshops" and "education conferences or seminars", both types of activities have been considered to have the least impact. This suggests that existing professional development activities may not necessarily be effective in promoting teachers' professional development and learning. It indicates a need for more ongoing, intensive and collaborative professional development in China as pointed out by Zeng and Day (2019), and internationally by Darling-Hammond et al. (2017) and Opfer (2016). Nevertheless, teachers have participated the most frequently in the activity of "mentoring and coaching", and have considered that participation in such professional development activity has the largest impact. This indicates a strength of teachers' professional development across the three schools, highlighting the importance of mentoring and coaching both in China (Kang et al., 2011; T. Wang, 2015) and internationally (Blank & Alas, 2009; Darling-Hammond et al., 2017; Ofsted, 2006; Opfer, 2016).

In terms of two-way ANOVA analysis, the results regarding the item 8.1.6 of individual or collaborative research have indicated that there is a statistically significant interaction between the effects of "school" and "teacher experience" on teachers' participation. Teachers in School C, in comparison to those in Schools A and B, have reported higher participation in individual or collaborative research. However, there are no statistically significant differences between teacher experience on this item. These findings indicate strong statistically significant differences between School C and Schools A and B in teachers' participation in individual or collaborative research. It seems that teachers in School C may have participated more frequently in individual or collaborative research activities.

7.2.1.2 PLCs: A Need for Enhancing Reflective Dialogue and Shared Sense of Purpose

The findings of the survey regarding PLCs have shown that around 80% of the teachers have reported direct observations of their classroom teaching for "deprivatised practice". Student performance has been considered with high importance for teachers' "collective focus on student learning". Teachers have collaborated with each other once a week or more for "collaborative activity". However, the findings of the survey have also suggested that, in terms of "reflective dialogue", teachers have only reported moderate change on their teaching practices and other related aspects. In comparison to the response category of "strongly agree" towards "shared sense of purpose", They have only agreed on the culture of shared responsibility, and collaborative school culture. Hence, teachers' responses towards both PLCs aspects of "reflective dialogue" and "shared sense of purpose" are slightly less positive than those towards other three scales. Therefore, a key argument regarding PLCs is that there is a need for enhancing teachers' PLCs practices of "reflective dialogue" and "shared sense of purpose" in the three schools.

For instance, the findings of the survey regarding "reflective dialogue" have shown that teachers have reflected the most frequently on teaching practices. Effective teaching practices in China have been identified in the literature (Grant et al., 2013; Meng & Muñoz, 2016; Miao et al., 2015; Teddlie & Liu, 2008). The findings have also suggested that teachers have reflected slightly less frequently on knowledge and understanding of their main subject fields, use of student assessment to improve student learning, classroom management

practices, and methods for teaching students with special needs. Nevertheless, only a moderate change has been reported for all the aspects. This moderate change is viewed to be relatively less positive in comparison to teachers' responses towards other PLCs scales. This indicates that more reflective dialogue is needed to enhance teachers' PLCs practices. This finding is in line with the findings of the TALIS Shanghai that the average score of the reflective dialogue scale for Shanghai teachers is slightly lower than the TALIS average across all TALIS countries and economies (OECD, 2016b). It is also in line with some key PLCs findings in China that teachers' reflective professional enquiry is questioned (OECD, 2016b; Thomas et al., 2017). Hence, it can be argued, based on the survey findings of this study, that it is essential to enhance teachers' PLCs practices of "reflective dialogue" in the three schools.

In terms of "shared sense of purpose", the findings of the survey have shown that teachers have generally agreed that there is a collaborative school culture which is characterised by mutual support. Teachers have also agreed that their schools have a culture of shared responsibility for school issues. Yet, teachers have only reported the extent of agreement on both items as "agree" rather than "strongly agree". This indicates a need for enhancing the shared sense of purpose in the three schools regarding a collaborative school culture characterised by mutual support and a culture of shared responsibility. The less positive responses of teachers towards "shared sense of purpose" may be related to some evidence in China regarding a lack of collaborative professional culture (J. Zhang et al., 2017). However, this finding differs slightly from what has been found in TALIS Shanghai that the average score of the shared sense of purpose for Shanghai teachers is considerably higher than the average of all TALIS countries and economies (OECD, 2016b). This reflects the complexity of examining PLCs school culture, given the range of different contexts in China (D. Wang et al., 2017).

In addition, the results of the survey have indicated that the most frequent activity of "deprivatised practice" in the three schools has been direct observation of classroom teaching from other teachers, accounting for approximately 80%. The finding is in line with that of the 2013 TALIS Shanghai that the percentage of classroom observation by other teachers in Shanghai is proportionally higher than that of the average across different TALIS countries (OECD, 2016b). This finding echoes the evidence of teacher professional development in China that peer observation is considered to have the highest impact on teachers'

professional development (Thomas & Peng, 2014). In addition, the aspect of direct observation of classroom teaching related to deprivatised practice has been followed by an analysis of students' test scores (75%), self-assessment of teachers' work (64%), student surveys about their teaching (56%), an assessment of their content knowledge (52%), and surveys or discussions with parents or guardians (48%). Students' test scores remain a top priority, as evidenced in the literature (Y. Liu & Dunne, 2009).

In terms of "collective focus on student learning", the findings of the survey have indicated that, teachers' collective focus on student performance in this study has been considered with high importance. The focus of teachers' collective focus on student performance can be evidenced by the PISA 2012 results of Shanghai, Hong Kong and Macau in Mathematics, Reading and Science (OECD, 2014a). However, the results of the survey have suggested that the focus on student performance has been slightly less important than that on related aspects such as student behaviour and classroom management, pedagogical competencies in teaching subject fields, and knowledge and understanding of their subject fields. Nevertheless, it can be noticed that these three related aspects are closely linked to teachers' knowledge and teaching skills, reflecting teachers' focus on teaching practices (Wong, 2010).

Crucially, the aspects of "deprivatised practice" and "collective focus on student learning" are evidenced in China that both aspects can positively predict teachers' self-efficacy in China (X. Zheng et al., 2019). The findings on these two PLCs aspects support those of the ITDEQC project regarding the Chinese PLCs aspects of group as well as individual professional learning, and collective responsibility for student learning (Thomas et al., 2017). These findings echo those of the GSCF project in Gansu China that PLCs practices are positively related to teachers' alignment with the use of new methods that are advocated by the new curriculum reform (Sargent, 2015). Evidence in China has shown that PLCs can affect teacher commitment (J. C.-K. Lee et al., 2011).

In addition, the results of the two-way ANOVA analysis have shown that there is a statistically significant interaction between the effects of "school" and "teacher experience" on the item 14.2 that there is a collaborative school culture which is characterised by mutual support. Teachers in School C agree more strongly than those both in School B and in School A on the

collaborative school culture. These findings indicate a strong difference between schools in collaborative school culture. It seems that there is a stronger collaborative school culture characterised by mutual support in School C.

7.2.1.3 Collaborative Reflective Enquiry: A Need for Supporting Use of Research and Evidence

The findings of the survey in this study have shown that teachers generally have reported frequent engagement in their collaborative reflective enquiry practices relating to collaboration, use of research and evidence, and reflection. They have reported participation in collaboration and reflection once a week or more, and yet in use of research and evidence only 1-3 times a month. Teachers' responses towards use of research and evidence are slightly less positive. Hence, a key argument regarding collaborative reflective enquiry is that there is a need to support further teachers' use of research and evidence in the three schools.

In terms of use of research and evidence, undertaking action research as a result of reflecting upon learning and teaching has been reported to be the most frequent enquiry activity. This has been followed by incorporating ideas from professional development activities into their practice, and comparing different sources of evidence when deciding what actions to take. Undertaking action research is in line with the limited evidence on collaborative reflective enquiry in China (Li & Laidlaw, 2006). It aligns with the strategies identified for promoting teacher professional development in China regarding using data to inform teacher development decisions and using action research (Qian & Walker, 2013). Undertaking action research is also in line with some of the conceptual evidence in China regarding self-organisation and use of research and data (Z. Lu, 2007; Yang & Yang, 2013; Zhu, 2014). It aligns with some international evidence that using action research and enquiry can contribute to the improvement of teacher professional development (Stoll et al., 2012). Teacher-driven research can positively affect student achievement (Akiba & Liang, 2016). Undertaking action research is also in line with the importance of research engagement discussed in the international literature (Furlong et al., 2014; D. H. Hargreaves, 1996). However, teachers have reported the lowest participation in evaluating their professional development activities, reading relevant research literature and looking outside the school for inspiration. This indicates a need for promoting these three types of enquiry practices related to use of

research and evidence in the three schools. Teachers' less positive responses towards reading relevant research literature is in line with the evidence of teacher professional development in China regarding individual or collaborative research (Ryan et al., 2009). The need for the evaluation of professional development highlights the evidence in China that there is a positive link between teacher professional development and students' value-added progress (Thomas, 2020).

With regard to collaborative activity, attending team conferences has been reported to be the most frequent collaborative activity, which is followed by engaging in discussions about the learning development of specific students, exchanging teaching materials with colleagues, and working with other teachers to ensure common standards in evaluations. This finding indicates frequent collaboration in the three schools, in line with the evidence of collaborative enquiry in China (Li & Laidlaw, 2006; Ying, 2007) and the PLCs practices in the Chinese context (J. C.-K. Lee et al., 2011; Qiao et al., 2018; Sargent, 2015; Sargent & Hannum, 2009; Thomas et al., 2017; D. Wang et al., 2017; T. Wang, 2016; J. Zhang et al., 2017; X. Zheng et al., 2019).

In terms of the reflection element of collaborative reflective enquiry, teachers have reflected on their practices the most frequently through talking to a colleague about learning and teaching, which is followed by discussing in team/staff meetings about how to improve the quality of learning and teaching, and applying wise suggestions to improve their practice. This finding is again in line with the evidence of collaborative reflective enquiry in China (Li & Laidlaw, 2006; Ying, 2007). However, teachers have reported the lowest participation in reflective practices of evaluating lessons, thinking about why and so what as well as what happened in evaluations, and modifying lessons as a result of reflection.

Adding to the above findings regarding collaborative reflective enquiry, the results of the survey on research engagement have suggested that teachers generally have had a "positive disposition to academic research in informing their teaching practice". For example, more than half of the teachers have agreed that information from research plays an important role in informing their teaching practice, and are able to relate information from research to their context. Nearly half of the teachers have known where to find relevant research that may help to inform teaching methods/practice, have been confident about analysing information

from research, and have used information from research to help them to decide how to implement new approaches in the classroom. Yet, more than one third of the teachers have found understanding academic research *not very easy*. This indicates a need for supporting teachers' research engagement as discussed before. Moreover, in terms of "the use of academic research to inform selection of teaching approaches", more than half of the teachers have reported that academic research was important in identifying a specific approach they used, and have thought that academic research has *some influence* on their decision to adopt pedagogical approaches. Yet, nearly half of the teachers have only consulted academic research *a little*. This means that teachers recognise the importance of academic research but only consult academic research a little. Apart from that, evidence regarding teachers' engagement with online evidence platforms has shown that, although around one third of the teachers have found understanding online platforms *quite easy*, nearly half of the teachers have only consulted online platforms *a little.* This indicates that there is a need to encourage teachers to consult online platforms more often.

7.2.1.4 Differences According to "School" and "Teacher Experience"

Overall, in terms of the differences of teachers' views on teacher professional development, PLCs and collaborative reflective enquiry, the results have suggested that there are statistically significant differences between schools (School A, B and C), particularly between School C and Schools A and B. It seems that teachers in School C, in comparison to those in Schools A and B, have reported higher participation in teacher professional development, PLCs and collaborative reflective enquiry. This may be partly because there is a stronger collaborative school culture characterised by mutual support in School C, as evidenced by the two-way ANOVA results. Nevertheless, this finding is more indicative rather than conclusive, given a small sample of this study within the same school district rather than across regions.

7.2.2 Key Findings of RQ2. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Concept, Typical Features and Perceived Benefits of Collaborative Reflective Enquiry and the Challenges for Their Collaborative Reflective Enquiry Practices?

7.2.2.1 Concept

The findings of the teacher interviews in this study have shown that the concept of collaborative reflective enquiry can be understood as "to explore and research collaboratively for improving teaching and learning". This is evidenced by teachers' professional development activities of Collective Lesson Planning as a typical form of collaborative reflective enquiry, given its relatively systematic enquiry nature of "research" into teaching. Collaborative reflective enquiry has been identified as a form of professional development practice associated with research into teaching in this study. Such understanding is in line with the definition of collaborative reflective enquiry outlined in Chapter 1 Introduction (The Ontario Ministry of Education, 2010). This finding suggests the relevance of collaborative reflective enquiry to rural China, in line with the evidence of Li and Laidlaw (2006) in the Chinese context. Given the link of collaborative reflective enquiry to PLCs, this finding hence supports the relevance of PLCs to China (Hairon & Tan, 2017; Sargent, 2015; Sargent & Hannum, 2009; Thomas et al., 2017; Thomas et al., 2018; D. Wang et al., 2017; T. Wang, 2015, 2016; Wong, 2010; J. Zhang & Pang, 2016; J. Zhang et al., 2017). Also, the findings of the interviews have indicated the relevance of teachers' collaborative reflective enquiry to student learning. Teachers have reported that careful attention has been given to student learning, especially student learning needs. This finding highlights the importance of student learning that collective focus on student learning is one key aspect of PLCs practice in China (Thomas et al., 2017; X. Zheng et al., 2019). The significance of student learning is demonstrated by the positive evidence of the ITDEQC project that examined the impact of teachers' professional development on students' value-added progress in China (Thomas, 2020). This finding on student learning is also in line with the evidence of collaborative reflective enquiry internationally (OECD, 2014a; The Ontario Ministry of Education, 2010; Timperley et al., 2007). Nevertheless, it seems that teachers in this study have focused on the student learning which is more narrowly defined and measured by student academic results.

However, slightly different from the definition outlined in Chapter 1 Introduction, the concept of collaborative reflective enquiry understood in this study has implied a stronger focus on teaching and curriculum. This finding is relevant to the PLCs findings of Wong (2010) and (Sargent, 2015) in China. This argument will be discussed in the subsequent section in more

detail, as it is related to the typical features of collaborative reflective enquiry identified in this study.

7.2.2.2 Typical Features

The findings of the interviews have indicated the typical features of collaborative reflective enquiry in this study regarding focus on teaching and curriculum, relevance to student learning, formal and informal collaboration, collaborative and individual reflection, use of evidence and academic research, iterative process of enquiry, and leadership support. For example, a key finding relating to the typical features of teachers' collaborative reflective enquiry in this study is its focus on teaching and curriculum. Teachers have reported that they have worked together to carry out "research" by planning lessons, doing presentations and giving feedback to each other on their teaching. It is linked to the evidence of teachers' effective teaching practices in China (Grant et al., 2013; Meng & Muñoz, 2016; Miao et al., 2015; Teddlie & Liu, 2008). However, it seems that the strong focus on teaching and curriculum identified in this study is slightly less emphasised in the international literature of collaborative reflective enquiry. This is partly because the issue around collaborative reflective enquiry in this study is not about how the enquiry could be organised and facilitated but about how the curriculum could be delivered, with the support of their collaborative reflective enquiry practices for student learning. Given that the Collective Lesson Planning and Teaching and Research Groups of this study are formally embedded in the three schools, teachers have generally focused more on ways of improving different pedagogical approaches to delivering the curriculum at pace. However, it seems that the collaborative reflective enquiry in the international literature focuses more on how teachers' collaborative reflective enquiry could be organised, and facilitated and guided by student learning (Butler & Schnellert, 2012; Butler et al., 2015; DeLuca et al., 2017; DeLuca et al., 2015; The Ontario Ministry of Education, 2010).

Another key finding about the features of collaborative reflective enquiry in this study is formal and informal collaboration. It has been reported that, despite some informal collaborative activities, teachers have typically collaborated with each other for collaborative reflective enquiry and professional development more formally than informally in the three

schools. This is partly because teachers generally attend professional development activities of collaborative reflective enquiry relating to Collective Lesson Planning, which are formally embedded in schools and organised by the Teaching and Research Groups. These intentionally arranged school structures are discussed in the PLCs literature in China to be useful for Chinese teachers' professional development and learning (Qiao et al., 2018; T. Wang, 2015). However, it can be argued that too formal collaboration may strengthen a top-down approach to teachers' collaborative reflective enquiry and professional development (Wong, 2012), and leave less room for more bottom-up, informal, genuine and authentic professional learning. The distinction between formal and informal collaboration can be illustrated as follows:

> "Collaborative cultures were established through informality and spontaneity around interests and activities that teachers created themselves, and were flexibly organized in time and space. Contrived collegiality, meanwhile, was formal, predetermined, and fixed in time and space in pre-set meetings through the exercise of administrative power." (A. Hargreaves, 2019, p. 8)

It can be noticed that the collaborative reflective enquiry identified in this study seems more aligned with contrived collegiality, in line with the literature of PLCs in China (T. Wang, 2015). Yet, the evidence based on the international literature has indicated that informal communication and teacher collaboration can positively affect student achievement (Akiba & Liang, 2016). Therefore, a key argument arising from this study is that there is potentially a need to promote more informal and genuine collaboration between teachers for a more balanced approach to formal and informal collaboration.

Another feature of collaborative reflective enquiry identified in this study is collaborative and individual reflection. Teachers have reported practices of collaborative reflection that they have reflected collaboratively on teaching and learning in Collective Lesson Planning and Teaching and Research Groups activities. They have also reported practices of individual reflection. As presented in the qualitative findings chapter, teachers' collaborative reflection has essentially built on their individual reflection in, on and for actions aimed at improving teaching practices. When teachers reflect collaboratively on teaching and learning, they need to start reflecting individually. This finding on collaborative reflection is in line with the

essential feature of collaborative reflective enquiry that has been identified in the literature in China (Ying, 2007). It is also in line with some international evidence regarding the importance of collaborative reflection (DeLuca et al., 2017; OECD, 2016b; The Ontario Ministry of Education, 2010). However, some teachers have questioned the depth of their reflection, arguing that reflective activities could be completed for administrative purposes. This highlights a further need for enhancing teachers' reflective practice, which confirms some evidence in this regard in China (OECD, 2016b; Thomas et al., 2017). Moreover, some teachers have been aware that there is a lack of criticality in their reflection. However, not much empirical evidence of critical reflection in China can be found in the Chinese context. It is worth investigating how the concept of critical reflection (Fook et al., 2016) could be conceptualised in China and within what boundaries the concept could be accommodated (Jay & Johnson, 2002).

In terms of the feature regarding use of research and evidence, the findings of the teacher interviews have shown that teachers have reported typically using exam results, student homework and teacher experience for evidence-based decisions on their professional practice of teaching and learning. The use of exam results has been common in the three schools, which is in line with the use of student outcomes to identify teachers' needs for improving student learning in the international literature (Muijs et al., 2014; Timperley, 2011; Timperley et al., 2007). Some evidence of this study has also suggested that teachers have engaged in academic research by publishing academic articles and undertaking research projects. However, the academic articles have been reported to be more based on teacher experience and personal opinions. It suggests that teachers' engagement in academic research may lack empirical evidence and academic rigour. This indicates a need for supporting teachers to use evidence wisely and engage in academic research scientifically and systematically (Li & Laidlaw, 2006; Z. Lu, 2007; Qian & Walker, 2013; Ryan et al., 2009; Yang & Yang, 2013; Zhu, 2014).

Another feature of collaborative reflective enquiry identified in this study is iterative process of enquiry. Teachers have reported participation in Collective Lesson Planning and Teaching and Research Groups iteratively. This is because the professional activities of collaborative reflective enquiry are structured and arranged by schools on a regular basis. Hence, teachers'

enquiry practices are iterative in nature. This finding reflects the iterative characteristic of collaborative reflective enquiry internationally (The Ontario Ministry of Education, 2010). Also, the findings of the teacher interviews have indicated that teachers have generally planned ahead, presented, discussed with one another and provided feedback on what was planned, presented and discussed. Teachers have typically started with reviewing recent issues related to teaching and learning, and have moved to presentations of lead teachers and the feedback teachers provided. The discussion processes have allowed teachers to exchange ideas about teaching and learning and learn from each other for improving their teaching practices. These findings reflect the cyclical nature of enquiry (Harris & Jones, 2012; T. Nelson & Slavit, 2008; Timperley, 2011; Timperley et al., 2007).

In addition, leadership support is another feature of collaborative reflective enquiry in this study. Some teachers have reported how the school leaders have been promoting their Collective Lesson Planning in relation to collaborative reflective enquiry. However, not much evidence has been reported in this respect, partly due to the scope of the study on teachers' perspectives. Hence, the data collected has not reflected sufficiently the views of school leaders, although teachers have mentioned some leadership-related practices. Nevertheless, as mentioned in the literature review, the importance of school leadership is identified as a significant aspect that can affect teachers' PLCs in China (T. Wang, 2016; J. Zhang et al., 2017; X. Zheng et al., 2019). Evidence in China has shown that instructional leadership can significantly affect the five PLCs components of collaborative activity, collective focus on student learning, de-privatised practice, reflective dialogue and shared sense of purpose in China (X. Zheng et al., 2019). Findings in the literature have also indicated that principal instructional leadership has moderate direct and indirect effects on teacher professional learning in China (S. Liu & Hallinger, 2018). In terms of the impact of leadership on student outcomes, evidence in China has shown that the aspect of principal leadership relating to instruction organisation is identified to be mostly highly correlated with student outcomes (Q. Zheng, Li, Chen, & Loeb, 2017). Relevant to this, evidence in the UK has indicated that transformational and instructional leadership strategies can positively affect student outcomes (Day, Gu, & Sammons, 2016).

7.2.2.3 Perceived Benefits

The findings of the teacher interviews in this study regarding the perceived benefits of collaborative reflective enquiry have shown that collaborative reflective enquiry can potentially enhance teachers' mutual learning and reflective thinking, improve teaching practices, and strengthen their capacity building. Teachers have reported that collaborative reflective enquiry can enable rural Chinese teachers to learn from each other for mutual learning, and motivate them to reflect more actively and deeply on teaching and learning. This finding is in line with the evidence of Ying (2007) regarding collaborative reflective enquiry in China. It aligns with the international evidence of DeLuca et al. (2017) that collaborative reflective enquiry can raise teachers' attention to teacher reflection for teacher professional development and learning (Butler & Schnellert, 2012; Carpenter, 2017).

7.2.2.4 Challenges

The findings of the teacher interviews have indicated the challenges for teachers' collaborative reflective enquiry practices regarding a lack of genuine collegiality, superficial reflection, less active engagement in academic research, and preference for conventional teaching practices. As presented in the qualitative findings chapter, teachers have reported that there is a lack of genuine collegiality in the three schools. The overall collaboration in the three schools, which seems more structured and to some extent contrived, may have lead teachers to collaborate for formality, and have prevented teachers from collaborating more spontaneously and informally. In part, this challenge of lacking genuine collegiality may be due to too formal and predetermined collaboration typically embedded within Teaching and Research Groups, as evidenced by the Chinese PLCs literature (T. Wang, 2015).

Moreover, teachers have reported the challenge for their collaborative reflective enquiry practices in relation to superficial reflection. Teachers in the three schools have questioned their depth and criticality of their reflection. This finding is in line with what has been identified in the survey evidence of PLCs in this study regarding a need for enhancing "reflective dialogue". It is also in line with the PLCs literature in China (Thomas et al., 2017) and internationally (OECD, 2016b).

Furthermore, teachers have reported less active engagement in academic research in the three schools. Teachers' engagement in academic research has been reported to be challenged by factors such as time and workload, indicating a need for supporting teachers' research engagement in the three schools. This finding is in line with the survey results of teacher professional development in this study regarding the need for promoting individual and collaborative research in China. This supports the evidence on individual or collaborative research identified in China (Ryan et al., 2009; Thomas et al., 2013).

More importantly, teachers have also reported another key challenge for their collaborative reflective enquiry regarding preference for conventional teaching practices. They have pointed out that some teachers in the three schools may have the tendency to employ a traditional teacher-centred pedagogical approach. This may indicate rural Chinese teachers' cultural and ideological attitudes towards knowledge transmission as rote learning, as evidenced in the literature (Tan, 2016). Teachers may have traditional beliefs about student learning, and lack the knowledge and skills needed to enable them to think outside the box, adopt new pedagogical approaches, and facilitate changes on teachers' teaching practices. Therefore, the conventional teacher-centred teaching practices have still dominated the narratives of teaching and learning in the three schools. This reflects the controversy in China's curriculum reform regarding teacher-centred and student-centred teaching and learning (Fu, 2018; Y. Liu & Dunne, 2009; Tan, 2016; Tan & Chua, 2015; You, 2019). Relevant to this challenge, evidence in the literature has shown that rural Chinese teachers may not have sufficient time to centre on students' needs for employing a student-centred pedagogical approach that engages students in active thinking and independent learning (D. Wang, 2011). Overall, teachers' preference for conventional practices in this study may have challenged teachers' collaborative reflective enquiry, preventing teachers from advancing teachers' philosophy of education, improving their ability to conduct research and increasing collaboration with colleagues. This echoes the findings in the international literature that the impact of collaborative reflective enquiry at the teacher level is whether it could advance teachers' philosophy and enhance teachers' ability to conduct research (D. Huffman & Kalnin, 2003).

7.2.3 Key Findings of RQ3. What Are the Views of Teachers in Three Secondary Schools of Rural Sichuan Province, China on the Strategies That Could Improve Their Collaborative Reflective Enquiry Practices?

The findings of the teacher interviews in this study have indicated the strategies that could improve teachers' collaborative reflective enquiry practices. These strategies include providing teachers with more external training opportunities and funding, encouraging more informal and genuine teacher-to-teacher collaboration, promoting school-to-school collaboration for external expertise, supporting research engagement, maintaining mentoring and coaching, incentivising teachers' participation in collaborative reflective enquiry and professional development and linking it to teachers' job title and pay, and enhancing teachers' commitment and passion towards teaching as a profession.

For example, one key strategy that has been reported by teachers is to provide them with more external training opportunities and funding to support their collaborative reflective enquiry and professional development practices. Teachers in the three schools have reported that external training expertise and funding could provide teachers with good opportunities for obtaining new ideas about their teaching beliefs and practices. It could essentially address the key challenge of teachers' collaborative reflective enquiry in relation to preference for conventional practices. This finding regarding external training opportunities is in line with the evidence identified in China (Wong, 2012), including rural China (Brock, 2009). Moreover, it has been reported by teachers in the three schools that school-to-school collaboration could be promoted for external expertise. Teachers have recognised the importance of working with teachers in other schools for idea exchanges. This indicates a need for promoting school-to-school collaboration as a strategy. This strategy relates to the significance of school-to-school collaboration in its impact on student attainment, as identified internationally (Muijs, 2015).

Furthermore, teacher have reported another key strategy for improving their collaborative reflective enquiry practices regarding incentivising their participation in collaborative reflective enquiry and professional development and linking it to teachers' job title, pay and career progression. Teachers in the three schools have reported their expectations for

teacher incentives such as performance-based job title and pay for participation in professional development activities. This reflects an incentive-based approach to teacher professional development in the international literature (Schleicher, 2016). It also relates to the issue of teacher commitment in China, as evidenced in the literature (Adams, 2012; Ding et al., 2011; Gu, 2013).

7.3 Discussion of Key Findings

The core arguments that have arisen from the findings are identified as follows. Further research is needed to investigate the focus of collaborative reflective enquiry and its purpose. More informal and genuine collaboration needs to be encouraged by school leaders and LEAs for facilitating a more balanced approach to teachers' collaborative reflective enquiry and professional development. More external expertise is needed for teachers' collaborative reflective enquiry and professional development to stimulate new ideas about their beliefs and practices. More incentives and entitlement need to be provided by school leaders and LEAs for enhancing teachers' commitment and passion towards teaching as a profession.

7.3.1 Further Research is Needed to Investigate the Focus of Collaborative Reflective Enquiry and Its Purpose

The findings based on teachers' perspectives of collaborative reflective enquiry in this study have indicated that teachers have reported frequent engagement in and understanding of collaborative reflective enquiry between teachers for their professional development and learning. Teachers' Collective Lesson Planning has been identified as a typical form of collaborative reflective enquiry in the three schools, which is essentially associated with "research" into teaching within school embedded structures of Teaching and Research Groups. Thus, the focus of the collaborative reflective enquiry is on teachers, and the purpose is to promote teachers' professional development and learning.

An interesting and original finding of this study is that the concept of collaborative reflective enquiry can be understood in rural China as "to explore and research collaboratively for improving teaching and learning". The purpose of such collaborative reflective enquiry is on

teachers' strong focus on teaching and curriculum, which seems slightly less emphasised in the international literature. As discussed earlier, this is probably because existing evidence on collaborative reflective enquiry in the international literature has a stronger focus on student learning (DeLuca et al., 2017; The Ontario Ministry of Education, 2010).

However, there is some evidence reported by teachers in this study regarding collaborative reflective enquiry with students as a pedagogical approach. Teachers have mentioned, in terms of enquiry as a pedagogical approach, that students need to be guided by teachers to learn independently, actively think and explore, and find the solutions of learning problems themselves. Students need to identify learning problems through observations, collect and analyse data, and solve the learning problems and share with peers. In this regard, the focus of collaborative reflective enquiry is on students, and its purpose is for student-centred learning.

Therefore, a key argument of this study is that more conceptual and empirical research is needed to clarify further the concept of collaborative reflective enquiry, its focus and purpose. Further research is needed to explore the extent to which the concept of collaborative reflective enquiry is used for teacher professional development, the focus of this study (T. Nelson & Slavit, 2008; The Ontario Ministry of Education, 2010, 2014; Timperley et al., 2007), and also for pedagogy (OECD, 2016a) and school improvement (Chapman et al., 2016). This could contribute significantly to the theoretical and empirical knowledge base of collaborative reflective enquiry.

7.3.2 More Informal and Genuine Collaboration Needs to Be Encouraged by School Leaders and LEAs for Facilitating a Balanced Approach to Teachers' Collaborative Reflective Enquiry and Professional Development

The findings of this study have indicated the typical features of collaborative reflective enquiry in the three schools regarding focus on teaching and curriculum, relevance to student learning, formal and informal collaboration, collaborative and individual reflection, use of evidence and academic research, iterative process of enquiry, and leadership support. Of these features, teachers' collaboration has been identified as a key aspect of collaborative

reflective enquiry in the three schools. This finding is in line with the substantial evidence of PLCs both in China and internationally (Bolam et al., 2005; Hord, 1997; Lomos, 2017; Lomos et al., 2011; OECD, 2016b; Pang & Wang, 2016; Qiao et al., 2018; Thomas et al., 2017). It also reflects a key characteristic of high quality professional development in the international literature (Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; Desimone, 2009; Garet et al., 2001; Kennedy, 2016; Opfer, 2016; Reid & Kleinhenz, 2015; Stoll et al., 2012).

However, the findings of this study have shown that teachers seem to collaborate with each other relatively more formally than informally, indicating a need for more informal and genuine collaboration. This is partly because majority of the teachers in the three schools typically participate in collaborative reflective enquiry activities relating to Collective Lesson Planning. These activities are relatively more formal and structured in nature. Hence, a key argument is that more informal and genuine collaboration needs to be encouraged by school leaders and LEAs for facilitating a more balanced approach to teachers' collaborative reflective enquiry and professional development in rural China.

Crucially, the significance of informal collaboration has been investigated both in China and internationally. For example, informal dialogue is considered to have the largest impact on teachers' professional development in China, together with peer observation and Teaching and Research Groups (Thomas & Peng, 2014). Informal collaboration is linked to research evidence in the US, in terms of the impact of teacher professional learning activities on student achievement, that informal communication and teacher collaboration can positively affect student achievement (Akiba & Liang, 2016). It is also related to the evidence in the UK that informal networking and formal structures can facilitate a school leadership approach to fostering research engagement (Cornelissen et al., 2017). It can be argued that, although intentionally arranged formal structures can support teachers' collaborative reflective enquiry and professional development and learning in the Chinese context (T. Wang, 2015), too formal and structural collaboration may lead to more "hierarchical" professional development activities (Hairon & Tan, 2017; Wong, 2012) and less teacher empowerment (Lai & Lo, 2007). Therefore, a balance between formal and informal collaboration needs to be struck for teachers' collaborative reflective enquiry and professional development in rural

China. As suggested in the international literature, both bottom-up and top-down approaches could be employed (Masino & Niño-Zarazúa, 2016).

7.3.3 More External Expertise is Needed for Teachers' Collaborative Reflective Enquiry and Professional Development to Stimulate New Ideas about Their Beliefs and Practices

The findings of this study have indicated the challenges for teachers' collaborative reflective enquiry in relation to a lack of genuine collegiality, superficial reflection, less active engagement in academic research, and preference for conventional teaching practices. In particular, teachers' preference for conventional teaching practices relating to a teacher-centred and exam-oriented pedagogical approach has been reported by some teachers to be difficult for them to adopt new pedagogical approaches such as a student-centred approach. This issue may not be easily addressed within teachers' own schools internally and therefore suggests a need for external expertise.

For example, the interview findings of this study have indicated that that teachers have commented on colleagues' tendency to employ a more traditional teacher-centred approach. This preference for a more traditional pedagogical approach has reflected the constraint of examination-oriented assessment on teachers' pedagogical choices as evidenced in China (Y. Liu & Dunne, 2009). It has also to some extent indicated Chinese teachers' culturally different understandings of the nature and transmission of knowledge, which can be evidenced by Tan and Chua (2015) and You (2019). Moreover, some evidence of this study has suggested that it has been difficult for teachers to try out new teaching ideas and employ new pedagogical approaches, given the constraints of time and resources, their limited knowledge and skills and relatively weaker professional capacity. This is in line with the evidence in rural China that a dilemma of time for student-centred teaching practices has been created in the rural Chinese context (D. Wang, 2011). It also supports other evidence in China that the conventional teacher-centred teaching practices have dominated in practice (You, 2019). Therefore, a key argument arising from the findings of this study is that more external expertise is needed for teachers' collaborative reflective enquiry and professional development to stimulate new ideas about their beliefs and practices.

Crucially, the importance of external expertise has been highlighted by the evidence both in China and internationally. Evidence in rural China has shown that external support is a necessary factor to unfreeze outdated practices and simulate change (Brock, 2009). Yet, some PLCs evidence in the Chinese context has indicated a shortage of external resources. This shortage of external resources can be also evidenced by teachers' responses towards their collaborative reflective enquiry and professional development practices in this study. Hence, more external expertise is arguably needed. Furthermore, the significance of external expertise has been identified internationally by Stoll et al. (2012) as a key aspect of effective professional development. It is supported by a review of school leadership evidence that cultivating and making use of external support is of great importance (Scott & McNeish, 2013).

7.3.4 More Incentives and Entitlement Need to Be Provided by School Leaders and LEAs for Enhancing Teachers' Commitment and Passion Towards Teaching as A Profession

The findings of this study have indicated the strategies that could improve teachers' collaborative reflective enquiry practices regarding incentivising teachers' participation in collaborative reflective enquiry and professional development and linking it to teachers' job title and pay, and enhancing teachers' commitment and passion towards teaching as a profession. Teachers' commitment has been reported to be a challenge for teachers' collaborative reflective enquiry and professional development. Some teachers feel less committed and motivated to their professional development and expect that their participation in collaborative reflective enquiry and professional development practices could be linked to their pay, job title and career progression. This indicates a need for providing rural Chinese teachers with more incentives and entitlement.

For example, teachers in this study have mentioned their concern about pay and career progression. This is in line with some evidence in China that there may be pay differences between teachers within the same school as a result of the performance pay reform in China (L. Wang, Lai, & Lo, 2014). Also, teachers in the study have indicated more entitlement to time, external professional development opportunities and financial support. This supports the evidence in China that time has been identified as a dilemma for rural Chinese teachers

and can influence teachers' commitment to professional development (Sargent & Hannum, 2009; D. Wang, 2011). Time is an important factor for teachers' collaborative reflective enquiry and professional, as evidenced internationally (Darling-Hammond et al., 2017; DeLuca et al., 2017; Villegas-Reimers, 2003). It has been suggested in the international literature that incentive-based and entitlement-based approaches to teacher professional development can impact on teachers' motivation and commitment (Schleicher, 2016). Therefore, the final key argument of this study is that more incentives and entitlement need to be provided by school leaders and LEAs for enhancing teachers' commitment and passion towards teaching as a profession.

7.4 Summary

This chapter has reviewed the key findings of all three research questions, and has discussed and compared these findings with previous research by presenting core arguments. The findings of the survey on teacher professional development have generally indicated teachers' frequent engagement in their professional development, PLCs and collaborative reflective enquiry practices with school differences. The findings, however, have indicated that there is a need to promote individual or collaborative research and qualification programme for teachers' professional development. There is a need for enhancing the PLCs practices of reflective dialogue and shared sense of purpose. There is also a need for supporting use of research and evidence related to collaborative reflective enquiry. Furthermore, the findings of the teacher interviews have shown that the concept of collaborative reflective enquiry is understood in this study as a form of professional development practice associated with "research" into teaching, which is in line with the definition outlined in Chapter 1 introduction. However, in terms of the typical features of collaborative reflective enquiry, it seems that teachers in this study have reported a strong focus on teaching and curriculum, which is slightly less emphasised in the international literature. Also, teachers have reported more formal collaboration between teachers for collaborative reflective enquiry practices, indicating a need for informality and a more balanced approach between formality and informality to collaborative reflective enquiry in rural China. Moreover, a key challenge for teachers' collaborative reflective enquiry is teachers' preference for conventional teaching practices relating to a teacher-centred

pedagogical approach. This teacher-centred pedagogical approach and the constraints of exam-oriented assessment system, time and resources have prevented teachers from trying out new ideas and employing new pedagogical approaches. Therefore, the core arguments arising from the findings are as follows:

- Further research is needed to investigate the focus of collaborative reflective enquiry and its purpose;
- More informal and genuine collaboration needs to be encouraged by school leaders and LEAs for facilitating a balanced approach to teachers' collaborative reflective enquiry and professional development;
- More external expertise is needed for teachers' collaborative reflective enquiry and professional development to stimulate new ideas about their beliefs and practices;
- More incentives and entitlement need to be provided by school leaders and LEAs for enhancing teachers' commitment and passion towards teaching as a profession.

Chapter 8 Conclusions

8.1 Introduction

This chapter starts with the main contributions of this study in substantive findings, methodology and research context. Given the study is relatively small-scale, it highlights the potential implications of the findings for extending in the Chinese context the theoretical knowledge of collaborative reflective enquiry, PLCs, and teacher professional development. The chapter subsequently outlines recommendations for policy and practice. It critically discusses the limitations of this study, and ends with future research that is needed on this topic.

8.2 Main Contributions

The main contribution of this study is to conceptualise, identify and present evidence on a typical form of collaborative reflective enquiry in relation to Collective Lesson Planning, based on teachers' perspectives in three secondary schools of rural China. This typical form focuses on relatively systematic and careful "research" into teaching, and is linked to Teaching and Research Groups in the three schools. The collaborative reflective enquiry in this study is understood as "to explore and research collaboratively for improving teaching and learning". Overall, the new substantive findings of this study on contextualising collaborative reflective enquiry within a rural Chinese context have tentatively addressed the gap relating to a lack of conceptual and empirical evidence on collaborative reflective enquiry in China.

For example, the findings of this study have highlighted some potential differences between Chinese and other international contexts in relation to teachers' collaborative reflective enquiry. It seems that the collaborative reflective enquiry reported by the teachers in the three schools has a very strong focus on teaching and curriculum, which is slightly less emphasised in the international literature. As detailed in Chapter 7 Discussion, the issue around collaborative reflective enquiry in rural China is not about how the enquiry could be organised but about how the curriculum could be delivered, with the support of their collaborative reflective enquiry practices. Also, the collaborative reflective enquiry is reported to be more formal and structured in nature. It to some extent lacks informality and

spontaneity and reflects “hierarchical” collaborative reflective enquiry in the context of rural China. A more balanced approach to formal and informal collaboration is therefore advocated for addressing the complexity of the rural Chinese context. Moreover, the collaborative reflective enquiry reported by the teachers in the three schools does encourage “functional” reflection of teachers on teaching and learning. Teachers generally reflect frequently on their teaching practices and student learning. However, there is not much criticality in teachers’ reflection on the self-questioning of their ideology, beliefs and practices. Hence, conventional teaching practices are dominant and the quality of collaborative reflective enquiry may be questioned. Arguably, more external expertise is needed for advancing teachers’ philosophy of education and improving teaching practices. Furthermore, although teachers have generally reported a positive attitude towards their use of research and evidence, teachers’ ability to undertake academic research is limited and may be challenged by resources such as time, space and human resources. This in turn challenges the international discourse on teachers’ use of academic research and evidence, as it requires teachers to have certain levels of knowledge and skills in conducting academic research scientifically and systematically.

Nevertheless, the new substantive conceptual and empirical findings have also suggested some similarities between the evidence reported in this small-scale study and the conceptual frameworks and empirical evidence of collaborative reflective enquiry in the international literature. For example, collaborative reflective enquiry has been identified by teacher interviewees as a useful approach to improving rural Chinese teachers’ professional development and learning by enabling teachers to work collaboratively, use research and evidence and enquire about student learning. The collaborative reflective enquiry reported by the teachers focuses on key elements of collaboration, reflection and enquiry, encourages teachers to share knowledge and experience for mutual learning and reflective thinking iteratively, and can potentially improve their teaching practices. Some teachers have reported that rural Chinese teachers may have weaker professional competency than those in urban China. Therefore, these teachers have reported that effective collaborative reflective enquiry practices could enhance their professional knowledge and skills and contribute to the improvement of their teaching practices. This reflects the role of collaborative reflective enquiry in building a stronger capacity for rural Chinese teachers, with which teachers could

adapt their teaching practices better to the needs of students with different backgrounds and abilities.

Methodologically, the sequential mixed methods approach employed in this new context of rural China has sought to maximise the strengths of both quantitative and qualitative methods to explore the concept of collaborative reflective enquiry from teachers' perspectives. For instance, the quantitative approach has been used to demonstrate breath across the three schools by capturing the general behaviour patterns of teachers' participation in teacher professional development, PLCs and collaborative reflective enquiry. The survey findings present an overview of positive responses towards teachers' collaborative reflective enquiry and related practices, and interestingly have identified school differences. The two-way ANOVA results of the survey have indicated a stronger collaborative school culture characterised by mutual support in School C, in comparison to Schools A and B. More importantly, the qualitative approach has been used to investigate depth by investigating systematically the concept, typical features and perceived benefits of teachers' collaborative reflective enquiry and the challenges and strategies for their collaborative reflective enquiry practices in the three schools. The interview findings based on teachers' perspectives indicate specifically how this concept is perceived, understood and applied in practice. Overall, this sequential mixed methods approach has contributed significantly to a deeper understanding of collaborative reflective enquiry not only at a relatively large scale but also in greater depth, relative to single lens quantitative analyses or purely qualitative approaches.

Furthermore, the focus of this study on the context of rural China has contributed substantively to the knowledge base of collaborative reflective enquiry, PLCs and professional development in China, thereby enhancing our understanding of collaborative reflective enquiry from a rural Chinese perspective. For instance, despite the limited teaching resources and lower teacher quality in rural China, teachers have still reported participation in collaborative reflective enquiry practices for their professional development and learning. This finding is in line with the relevance of the PLCs concept to the rural Chinese context (Sargent & Hannum, 2009). Also, teachers have reported the challenges for their collaborative reflective enquiry in rural China regarding a lack of genuine collaboration, superficial reflection and less active engagement in academic research, and preference for conventional

practices. The collaborative reflective enquiry in the three schools is particularly challenged by rural Chinese teachers' preference for conventional practices, which has been argued in previous sections to be difficult for teachers to unfreeze outdated teaching practices. Therefore, there is a need for school leaders and LEAs to provide rural Chinese teachers with more external training opportunities and funding, and incentivise their participation in collaborative reflective enquiry and professional development, thereby enhancing their commitment and passion towards teaching as a profession.

Overall, these findings, although small-scale, have provided valuable insights into teachers' collaborative reflective enquiry and professional development in a new context of rural Sichuan Province, China. The findings have added to the empirical evidence on related topics of research projects such as ESRC-DfID funded ITDEQC (Thomas & Peng, 2014; Thomas, Peng, & Li, 2015; Thomas et al., 2017; Thomas et al., 2018) and GSCF (Adams, 2012; An et al., 2008; Q. Chen, 2009; Hannum et al., 2011; Sargent & Hannum, 2005, 2009; Yiu & Adams, 2012). The findings have also contributed to broadening the international literature of collaborative reflective enquiry (Butler & Schnellert, 2012; Butler et al., 2015; Chapman et al., 2016; DeLuca et al., 2017; DeLuca et al., 2015; Harris & Jones, 2012; The Ontario Ministry of Education, 2010; Timperley et al., 2007).

8.3 Implications for the Theoretical Literature

The research findings of this study have indicated the important role of collaborative reflective enquiry in promoting teachers' professional development and learning, thereby supporting the significance of collaboration, reflection and enquiry as key elements of professional development and PLCs highlighted by previous research. For example, the survey findings of this study have suggested that teachers in school C with a stronger collaborative school culture have reported higher participation in their professional development activities. This underlines the potential of collaborative professional development in enhancing teachers' professional learning in China, as also evidenced by the international literature (Barrera-Pedemonte, 2016; Darling-Hammond et al., 2017; A. Hargreaves, 2019; Kennedy, 2016; OECD, 2016b; Opfer, 2016). It also supports the previous evidence relating to collaborative professional development and PLCs in China (L. Chen, 2020; Hairon & Tan, 2017;

Zeng & Day, 2019). The interview findings of this study have shown that formal and informal collaboration is reported by teacher interviewees as one typical feature of collaborative reflective enquiry in the research context, together with consistent focus on student learning and iterative process of enquiry. These features reflect the characteristics of high quality teacher professional development in the literature regarding collective participation, content focus, and duration (Darling-Hammond et al., 2017; Desimone, 2009). Moreover, the findings of this study have indicated that teachers in the three schools generally reflect frequently on their teaching and learning practices, although they are not certain about the depth and criticality of their reflection. Nevertheless, this supports the need for enhancing teachers' reflective practice for their professional development and learning, in line with the evidence identified in the international literature (Chetcuti et al., 2011; Fazio, 2009; Roblin & Margalef, 2013). Furthermore, the survey findings of the study have suggested that teachers in School C report higher participation in individual or collaborative research than those in Schools A and B. The interview findings have identified the Collective Lesson Planning relating to collaborative reflective enquiry as a useful approach to promoting rural Chinese teachers' professional development in the three schools. Both findings support the importance of undertaking individual or collaborative or both types of research for enhancing teachers' professional development and learning. In addition, the evidence of this study has tentatively addressed issues of teachers' commitment, the shared sense of purpose at the school level, and the different professional learning activities, supporting the importance of examining teacher commitment and resilience for teachers' professional development and learning both internationally and in China (Day & Gu, 2007; Day et al., 2006; Gu, 2013; Gu & Li, 2013; Zeng & Day, 2019). Apart from that, another key implication of this study for teacher professional development is related to an approach to teacher professional development that focuses on seeking external expertise for professional development to stimulate new ideas about teaching and learning. This supports the evidence identified in China regarding external support (Brock, 2009). This is partly because internal professional development may not address sufficiently the influence of teachers' cultural and local attitudes towards conventional teaching practices and their tendency to employ a teacher-centred approach. Hence, external expertise is advocated for teachers' collaborative reflective enquiry and professional development from a rural Chinese perspective.

This study has built upon the key features of collaborative reflective enquiry outlined by the Ontario Ministry of Education regarding "relevant, collaborative, reflective, iterative, reasoned, adaptive and reciprocal" (The Ontario Ministry of Education, 2010). These features have been used to inform the analysis of the data on the concept of collaborative reflective enquiry and its role in promoting teachers' professional development and learning. The key themes regarding collaborative, reflective and reasoned are directly related to the key elements which have been combined to conceptualise an overarching concept of collaborative reflective enquiry. Also, the study has built upon the PLCs framework of the EPLC project in relation to eight PLCs dimensions "collaboration focused on learning, reflective professional enquiry, shared values and vision, collective responsibility for pupils' learning, group as well as individual professional learning, openness, networks and partnerships, inclusive membership, mutual trust, respect and support" (Bolam et al., 2005). These eight features have been employed to frame the concept of collaborative reflective enquiry which builds on the concept of collaborative enquiry used in the international literature. In addition, this study has built upon the empirical evidence of the ESRC-DfID funded ITDEQC (Thomas & Peng, 2014) and GSCF (Sargent & Hannum, 2009) projects that focused on the key aspects of teachers' work, children and families.

The study has also challenged the typically Western approaches to promoting teachers' collaborative reflective enquiry and professional development in the literature within a context which is more structural and directive in nature, thereby emphasising the importance of recognising context specificity when considering implications for teacher professional development reforms. The approach discussed in this study does not solely support either a bottom-up or top-down approach. Instead, it advocates a hybrid approach to promoting teachers' professional development and learning in China which builds upon both bottom-up and top-down approaches. It is evidently clear that the Collective Lesson Planning identified in this study has been functioning as a typical form of collaborative reflective enquiry within the three schools, but may still need more and additional loose-coupled structures with spontaneity for genuine collaboration and enquiry to flourish. There is a need for a more balanced approach between formal and informal collaboration to support and encourage enquiry through loosening the hierarchy and organisational barriers.

With reference to complexity theory, this study has supported and built upon the key principles of complexity theory regarding self-organisation, connectivity, interdependence and feedback. These principles are related to the concepts of PLCs and collaborative reflective enquiry, and can reflect the complexity of the interrelated relationships between collaborative reflective enquiry, PLCs and professional development. Moreover, this study has highlighted the issue of teacher autonomy in China which needs to be further examined in relation to the complex contextual, cultural, system-wide barriers in the Chinese context.

8.4 Implications for Policy and Practice

The implications for policy and practice are discussed in this study, based on the survey and interview findings presented in Chapters 5 and 6, and the core arguments discussed in Chapter 7. LEAs and school leaders could review the implementation of the policy document "Opinions on Strengthening Teacher Workforce" (see Chapter 2) and related local policy documents, and focus on enhancing the collaborative school culture which is characterised by mutual support. By reviewing existing school structures such as Collective Lesson Planning linked to Teaching and Research Groups, it would be useful for LEAs and school leaders to build more collaborative structures through a balanced approach to formal arrangement and informal networking for improving teachers' commitment, self-efficacy and autonomy. For example, school-wide and cross-region informal "critical friends" networks could be encouraged for teachers to socialise, build trust and share their knowledge and skills with one other. These networks could be used to link to teachers' Collective Lesson Planning and Teaching and Research Groups.

On the basis of such collaborative structures, values for teacher-led research could be enhanced further to improve the effectiveness of Collective Lesson Planning practices linked to Teaching and Research Groups for building teachers' stronger capacity in undertaking research into teaching. For example, "university-school partnerships" could be established regionally to provide teachers with opportunities in researching collaboratively with university academics. Through such partnerships, the academic coded knowledge could be mobilised and used by school teachers in practice more directly.

Moreover, more external opportunities, funding and expertise could be facilitated, with the support of LEAs and school leaders, to establish an "online evidence database" so as to support the Collective Lesson Planning, Teaching and Research Groups and "Critical Friends" networks. This online evidence database could be used to stimulate new ideas about teaching and learning, and share effective practices and examples with teachers within and beyond schools. Teachers' participation in these professional development activities could be incentivised by LEAs and school leaders to build their professional development profiles, which could be used as the evaluation evidence for their performance, job title and pay rise.

In addition, the conceptual, yet practical framework that is supported by the empirical evidence of this study could be employed by LEAs and school leaders, and incorporated into their local policy documents related to the "Opinions on Strengthening Teacher Workforce". It could be used to provide rural Chinese teachers with a rationale for teacher-led research into teaching. The cyclical and iterative process of teacher collaborative reflective enquiry could enable teachers to continuously identify student learning needs, collect evidence, examine the impact of the enquiry, and draw conclusions on the impact. Teachers could collaborate more actively with each other in groups, compare different sources of evidence, and reflect more deeply and critically on their professional practice and experience.

Particular attention needs to be given to the wider contextual, cultural, system-wide and other barriers to change on teachers' and schools' professional practice. For example, hierarchy may be loosened to give teachers more autonomy for teacher-led research and PLCs practices in order to enhance teachers' professionalism. Future policy and practice may focus on empowering teachers to engage more actively in their collaborative reflective enquiry, PLCs and professional development practices. Issues of structural and funding inequalities need to be tackled further, with a particular focus on teachers and schools in rural China. It is also important to seek external expertise to stimulate teachers' new ideas about teaching and learning to address the issue of teachers' attitudes towards knowledge-based transmission on rote learning in the Chinese context. Most importantly, the examination-driven assessment system may need to be improved by introducing fairer, more scientific and comprehensive evaluation approaches (e.g. value-added) in order to increase the possibility in teachers' selection of different pedagogical approaches.

8.5 Limitations of the Study

The limitations of the study are critically discussed, in terms of the key aspects of conducting a piece of research regarding the scope, research design, the quality of the data, and the validity and trustworthiness of the findings[15]. For example, there are limitations in the scope of this study. Given that the findings of this study are based primarily on teachers' perspectives in three rural schools of the role of collaborative reflective enquiry in promoting their professional development and learning, the arguments and claims based on such perspectives have limitations and can only shed some light on this issue. A wider range of perspectives from a larger sample and different key stakeholders such as headteachers and LEAs officers could have been investigated to obtain insights from different angles regarding teachers' collaborative reflective enquiry and professional development practices. Nevertheless, this study has provided rural Chinese teachers with an opportunity to voice out their thoughts and views of this topic.

Also, in terms of the research design, con-current mixed methods research, with quantitative and qualitative approaches sharing the same status, could have been designed to obtain an even more holistic view of teachers' participation in and views of collaborative reflective enquiry, PLCs, and teacher professional development. In doing so, the scope of the research and the design of the research questions could have been enlarged. The teacher survey and interviews could have been conducted con-currently to obtain findings for addressing all research questions respectively. In that case, triangulation of the results could be discussed at the end of the research to compare the similarities and contradictions of the findings. However, it may take longer time for the researcher to complete this project, despite the potential of such design for richer evidence.

Moreover, the quality of the data could have been better enhanced through a carefully refined design, framing and translation of the survey and interviews. For instance, given that the research instrument of this study has comprised different survey sources in English

[15] For details about the methodological limitations of data sampling, collection and analysis, please see Section 4.11 Methodological Limitations.

language, further efforts could have been made to enhance further the clarity and appropriateness of the translation from English to Mandarin Chinese for both teacher survey and interviews. It would be useful to provide research participants with written notes and definitions of key academic terms, alongside oral explanations. Nevertheless, this limitation may also apply to other studies drawing on instruments and literature in a different language.

Furthermore, there are limitations in the validity of the survey findings. This is because the scales that have been replicated and adapted from other sources may have their own limitations, not representing fully the key constructs measured in this study. The sample size based on a convenience sample out of a huge Sichuan Province in China is relatively small. Hence, the survey findings of this study are more indicative rather than conclusive. However, within the PhD scope of this research, a pilot study has been conducted beforehand to test the reliability of the questionnaire items in this new research context. The survey items drawing on previous research instruments have been validated internationally with high validity and reliability.

In addition, there are also limitations in the trustworthiness of the interview findings. This is in part due to the ambiguity in the focus of the enquiry in China, and teachers' unfamiliarity with academic terms. Thus, the richness of the data may, to some extent, have been undermined as a result of some rural teachers' simple and descriptive responses. Further efforts could have been made to guide the interviewees for even more in-depth responses throughout the interview processes. Also, the themes and quotes extracted from a small interview sample may not reflect the whole reality of the issue around collaborative reflective enquiry in rural China. However, the interview data collected in this study and the critical reasoning based on the interview data can to a large extent represent the views of the teacher interviewees in the three schools. Besides, the depth of interviewing is an issue that always needs to be addressed in other qualitative research.

Apart from that, given that the concepts of collaborative reflective enquiry and PLCs have their origins from Western context, it is critical to pay further attention, when examining collaborative reflective enquiry in China, to the contextual and cultural constraints that may emerge. The scope of the study may be extended to explore the perceptions of different

stakeholders from a broader perspective on the possibility and strategies for teachers to employ this approach of collaborative reflective enquiry to promote their professional development in practice. For future research, more attention may be given to the priorities of the context sensitivity of collaborative reflective enquiry, and its tensions under particular circumstances regarding the policy environment, resources, teacher autonomy and professionalism in China.

8.6 Future Research

Given that there is a lack of conceptually and empirically grounded knowledge base of collaborative reflective enquiry both in China and internationally, further research is needed to explore this concept through qualitative and quantitative methods for better insights. For example, further research could be conducted via qualitative methods to investigate different forms of collaborative reflective enquiry and their challenges across contexts. The Collective Lesson Planning of this study has been identified as a typical form of collaborative reflective enquiry from a rural Chinese perspective, with challenges regarding a lack of genuine collegiality, superficial reflection, less active engagement in academic research, and preference for conventional teaching practices. However, the forms and challenges may differ in other contexts, and could be influenced by different socio-cultural conditions and relevant contextual factors. Further research is needed to investigate its definition, typical features and perceived benefits both in China and internationally.

Moreover, further research could also be carried out through quantitative methods to focus on the impact of collaborative reflective enquiry and teacher outcomes and student achievement, and explore the factors that could affect collaborative reflective enquiry. For example, existing evidence seems to point to the benefits of collaborative reflective enquiry on teachers in terms of teachers' attitude, engagement, commitment, efficacy and agency (Butler et al., 2015; DeLuca et al., 2017; D. Huffman & Kalnin, 2003). However, rare research has examined directly the impact of collaborative reflective enquiry on student achievement both in China and internationally. Further research is needed to examine the impact of collaborative reflective enquiry on teacher outcomes and student achievement. Although tentatively identified in this study, factors that affect collaborative reflective enquiry (such as

school leadership and culture) could also be further explored. In addition, further research could be conducted to examine and compare the extent and variations of the three elements relating to collaboration, reflection and use of research across contexts.

In terms of PLCs, further research is needed to investigate teachers' PLCs practices regarding "reflective dialogue" and "shared sense of purpose". This can be evidenced by teachers' slightly less positive responses towards both aspects. Yet, it has been acknowledged in the literature that the concept of PLCs requires teachers to reflect deeply and critically on their teaching practices and student learning for a shared sense of purpose (Bolam et al., 2005; Hord, 1997; OECD, 2016b). Therefore, further research could be conducted to explore the PLCs aspects of reflective dialogue and shared sense of purpose. Besides, qualitative research methods could be employed to investigate teachers' views of their own experiences within PLCs in order to enrich the quantitative findings of PLCs.

In terms of teacher professional development, further research is needed to investigate how teachers' individual or collaborative research could be promoted, for example, via school leadership, to affect teaching practices and student achievement. The evidence of this study has indicated a need for individual or collaborative research and the necessity of using theoretical knowledge and academic research to underpin and inform teachers' professional practice in the three schools. However, not much evidence of school leadership has been collected due to the scope and samples of this study. Therefore, further research is needed to explore the role of school leadership in facilitating teachers' individual or collaborative research for their professional development to affect teaching practices and student achievement. Also, given that this study has not investigated the impact of collaborative reflective enquiry and professional development on student learning. Further research could be conducted to examine the impact of different high-quality professional development activities on student achievement in China, so as to extend and refine the findings in the literature.

Overall, conducting this piece of mixed methods research on collaborative reflective enquiry has significantly developed and enhanced my research skills for personal learning. The process of conducting quantitative analyses of the survey data repeatedly has provided me

with an opportunity for understanding the key principles of examining and demonstrating the patterns of survey data. To be able to make critical judgements about the selection of analysis methods is key to drawing valid and reliable conclusions for describing the nature of the data. Also, the qualitative analysis process of extracting key themes and quotes analytically from transcriptions has enhanced my understanding of exploring the complexity and depth of forming arguments based on the interview data. Whilst it is crucial to understand what the codes and themes indicate at different levels, it is equally important to make meaning of these codes and themes for the core arguments and crucially for the whole picture that can represent the interview data. Nevertheless, I aim to further enhance my analytical and critical thinking skills to problematise research issues, literature and evidence in future research.

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Appendix 1. Letter of Introduction

6th October 2017
2017 年 10 月 6 日

To Whom It May Concern,
见信悉，

My name is Dini Jiang. I am a Full Time doctoral student at the School of Education, University of Bristol, UK, for the degree of Education (PhD). The research I wish to conduct for my PhD thesis investigates the role of collaborative reflective enquiry in promoting teachers' professional development and learning in rural Southwest China. This study will be conducted under the supervision of Professors Sally Thomas and Guoxing Yu at the School of Education.
我叫蒋迪尼。现为英国布里斯托大学教育学院全日制教育学博士研究生在读。我的博士论文旨在探索合作反思探究对促进中国西南农村地区教师专业发展的作用。此项研究将由教育学院 Sally Thomas 教授和 Guoxing Yu 教授进行指导和实施。

I am hereby seeking your consent for me to approach your school (s) and teachers for data collection.
因此，我特此请求您的同意，准许我为数据收集联系您的学校和老师。

Should you have any further questions, please do not hesitate to contact me on +44 (0) 7928 530914 and dini.jiang@bristol.ac.uk. Thank you very much for your time and consideration in this matter.
如果您有任何疑问，请通过电话+44 (0) 7928 530914 和邮箱 dini.jiang@bristol.ac.uk 与我联系。谢谢您的时间及对此事的考虑。

Yours sincerely,
敬上，

Dini Jiang
蒋迪尼

Doctoral Student
School of Education
University of Bristol
博士研究生
布里斯托大学教育学院

Appendix 2. Information and Consent Form

CONSENT FORM

同意书

Date: 01/08/2018

日期：2018 年 8 月 1 日

Study Title or Topic: Exploring the role of collaborative reflective enquiry in promoting teachers' professional development and learning in rural Southwest China

研究标题或主题：探索合作反思探究对促进中国西南农村地区教师专业发展和学习的作用

Researcher: Dini Jiang, PhD Student at the School of Education, University of Bristol, UK

研究员：蒋迪尼，英国布里斯托大学教育学院博士研究生

Purpose of the Research: To explore the views of second school teachers in rural Southwest China on the role of collaborative reflective enquiry in promoting their professional development and learning

研究目的：探索中国西部农村地区中学教师关于合作反思探究对于促进其专业发展和学习作用的看法

What You Will Be Asked to Do in the Research: To participate in anonymous interviews

在这个研究里您需要做的是：参与匿名采访

Risks and Discomforts: The researcher does not foresee any risks or discomfort from your participation in the research.

风险和不便之处：研究员不预见任何您参与此研究的风险和不便之处。

Benefits of the Research and Benefits to You: To provide reliable and valid data for the research and to provide useful feedback for the school

对研究和您的益处：为研究提供可靠且有效的数据，为学校提供有用的反馈

Voluntary Participation: Your participation in the study is completely voluntary and you may refuse to answer any question or choose to stop participating at any time. Your decision not to volunteer will not influence your relationship with the researcher or the University of Bristol, either now or in the future.

自愿参与：此研究是秉着完全自愿的原则参与，您可以拒绝回答任何问题或选择在任何时候退出。您不愿意参加的决定不会影响现在或将来您和研究员或布里斯托大学的关系。

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you decide so. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher or the University of Bristol. Should you decide to withdraw from the study, all data generated as a consequence of your participation will be destroyed.

从研究中退出：如果您一旦决定退出，您可在任何时候，因为任何原因退出。您决定退出或拒绝回答任何问题都不会影响您和研究员或布里斯托大学的关系。如果您一旦选择从研究中退出，所有您参与而生成的数据将会被摧毁。

Confidentiality: All information you supply during the research will be held confidentially and your name will not appear in any report or publication of the research. Your data will be safely stored in a locked facility and only the researcher will have access to this information.

机密：在研究过程中您所提供的所有信息都会被机密保存。您的名字不会出现在任何研究报告或出版物中。您的数据会被安全的保存在一个封锁的设备里，只有研究员才能接触这些信息。

Questions about the Research: If you have questions about the research in general or about your role in the study, please feel free to contact Dini Jiang, PhD Student, at the School of Education, 35 Berkeley Square, Bristol, BS8 1JA, telephone + 44 (0) 117 928 9000 or by e-mail (dini.jiang@bristol.ac.uk). If you have any questions about this process or about your rights as a participant in the study, please contact the Ethics Coordinator Dr Amanda Williams (a.williams@bristol.ac.uk).

关于研究的问题：如果您有任何关于研究或您在研究中的角色问题，请随时联系教育学院（35 Berkeley Square, Bristol, BS8 1JA, telephone + 44 (0) 117 928 9000）博士研究生蒋迪尼 (dini.jiang@bristol.ac.uk)。如果您有任何关于研究过程或您作为参与者权利的相关问题，请联系教育学院伦理道德协调员 Dr Amanda Williams (a.williams@bristol.ac.uk).

Legal Rights and Signatures:

You consent to participate in the study of exploring the role of collaborative reflective enquiry in promoting teachers' professional development and learning in rural Southwest China. You are not waiving any of your legal rights by signing this form. Your signature below indicates your consent.

依法享有的权利和签名：

您同意参加合作反思探究对促进中国西南农村地区教师专业发展和学习作用的研究。您不放弃签名以后的任何依法享有的权利。您下面的签名表示您同意参与。

Signature （签名） _____ **Date （日期）** _____

Appendix 3. GSoE Research Ethics Form

GSoE RESEARCH ETHICS FORM

It is important for members of the Graduate School of Education, as a community of researchers, to consider the ethical issues that arise, or may arise, in any research they propose to conduct. Increasingly, we are also accountable to external bodies to demonstrate that research proposals have had a degree of scrutiny. *This form must therefore be completed for each piece of research carried out by members of the School, both staff and students*

The GSoE's process is designed to be supportive and educative. If you are preparing to submit a research proposal, you need to do the following:

1. **Arrange a meeting with a fellow researcher**
   The purpose of the meeting is to discuss ethical aspects of your proposed research, so you need to meet with someone with relevant research experience. A list of prompts for your discussion is given below. Not all these headings will be relevant for any particular proposal.
2. **Complete the form on the back of this sheet**
   The form is designed to act as a record of your discussion and any decisions you make.
3. **Upload a copy of this form and any other documents (e.g. information sheets, consent forms) to the online ethics tool at:** https://dbms.ilrt.bris.ac.uk/red/ethics-online-tool/applications**.**

   Please note: Following the upload you will need to answer ALL the questions on the ethics online survey and submit for approval by your supervisor (see the flowchart and user guides on the GSoE Ethics Homepage).

If you have any questions or queries, please contact the ethics co-ordinators at: gsoe-ethics@bristol.ac.uk

Please ensure that you allow time before any submission deadlines to complete this process.

Prompts for discussion
You are invited to consider the issues highlighted below and note any decisions made. You may wish to refer to relevant published ethical guidelines to prepare for your meeting. See http://www.bris.ac.uk/education/research/networks/ethicscommittee/links/
for links to several such sets of guidelines.

Researcher access/ exit
Information given to participants
Participants right of withdrawal
Informed consent
Complaints procedure
Safety and well-being of participants/ researchers
Anonymity/ confidentiality
Data collection
Data analysis
Data storage
Data Protection Act
Feedback
Responsibilities to colleagues/ academic community
Reporting of research

Be aware that ethical responsibility continues throughout the research process. If further issues arise as your research progresses, it may be appropriate to cycle again through the above process.

Name(s): Dini Jiang

Proposed research project: Exploring the Role of Critical Reflection in Promoting Teacher Professional Development and Teacher Effectiveness in Rural Southwest China

Proposed funder(s): China Scholarship Council

Discussant for the ethics meeting: James MacPherson

Name of supervisor: Professors Sally Thomas & Guoxing Yu

Has your supervisor seen this submitted draft of your ethics application? Yes

Please include an outline of the project or append a short (1 page) summary:

This study seeks to examine the significance of critical reflection in promoting teacher professional development so as to improve teacher effectiveness. It is an exploratory mixed methods study that explores the role of teachers' critical reflection in promoting their professional development and effective teaching practices in a rural area of Southwest China. It builds on recent research evidence from the status quo (Ding et al., 2011; Thomas, 2013, also see country note of Shanghai - China, OECD, 2014) and dilemmas (Thomas et al., 2016; Yin, 2014) of teacher professional development in China that Chinese teachers' *jiaoxue fansi* (teaching reflection) generally lacks breadth and depth and needs to be promoted further to improve their *jiaoxue fansi li* (reflective teaching ability) (Shao & Gu, 2010; also see for example Li & Zhang, 2006; Zhang, 2004; Zhang et al., 2009; Zhao & Lu, 2007). It focuses on an under-researched but significant dimension of teacher effectiveness in China - teacher reflectivity (Teddlie et al., 2006, also see Adams, 2012; An et al., 2008; Grant et al., 2013; Meng & Muñoz, 2016; Miao et al., 2015; Peng et al., 2014; Teddlie & Liu, 2008; Yiu & Adams, 2012), i.e. the term of teachers' 'reflection'/'critical reflection' often used in teacher education (Dewey, 1933; Hébert, 2015; Schön, 1983; Smyth, 1989).

Broadly speaking, this study will address research questions as follows:

RQ1. To what extent do teachers in rural Southwest China engage in reflective enquiry for professional development, from the perspectives of teachers in three junior secondary schools? What are the inferences about their reflection ability? Do teacher perspectives on reflective practice vary by background factors such as gender or experience?

RQ2. Under what conditions do teachers in rural Southwest China learn from professional development, from the perspectives of teachers in three junior secondary schools? What are the factors that affect critical reflection in promoting teachers' professional development in rural Southwest China? How does their reflective enquiry impact on student learning outcomes?

RQ3. What are the strategies that enhance teachers' critical reflection in promoting teacher professional development and teacher effectiveness in rural Southwest China?

In general, a sequential mixed-methods approach (Quan + QUAL) will be employed in this study, with a quantitative approach (first phase) followed by a qualitative approach (second phase) (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2006). The qualitative approach will have the dominant status. Specifically, a quantitative teacher survey will be conducted in the first phase to collect data on teachers' reflective practices from all teachers (N=300) in three junior secondary schools of rural Southwest China. Qualitative semi-structured interviews (N=12) will be conducted in the second phase to collect data regarding factors that affect teachers' professional development through critical reflection. Overall, strategies that enhance teachers' critical reflection in promoting teacher professional development and teacher effectiveness will be outlined.

Ethical issues discussed and decisions taken (see list of prompts overleaf):

In accordance with the Ethical Guidelines for Educational Research (BERA, 2011) and GSoE research ethics form, ethical issues that arise, or may arise, have been discussed with a fellow researcher at this stage. Specifically, permission will be obtained from all school gatekeepers for the two phases of data collection. Written guidance will be provided on the questionnaire, along with oral explanations. Participants have the right to withdraw from the study and a cut-off date may be set on the written document with regard to the participants' right of withdrawal. Informed consent (BERA, 2011) will be obtained from all participants for each stage of data collection. Contact information on complaints procedure will be provided on the written document and the participants have the right to complain if they feel there is a need to do so. There is a particular need to emphasise the voluntary participation of the participants for the sake of their safety and well-being. The questionnaires will be completely anonymous and confidential but there is a need to address how to match surveys with participants whilst maintaining anonymity. The data obtained would be held confidentially and stored safely, in accordance with the Data Protection Act (BERA, 2011). Encrypted data may be generated for confidentiality reasons. The question on

how often and how much feedback needs to be provided needs to be addressed carefully. The researcher has the responsibility to maintain the reputation and public image of the University of Bristol throughout the process.

Apart from that, the issue of power dynamics may arise (Kvale & Brinkmann, 2009). It exists at the moment when teachers are asked to complete the questionnaires by their school leaders. Chances are that teachers may complete the questionnaires under the pressure of administrative power. Therefore, there is a particular need to emphasise the importance of '*voluntary participation*' for the authenticity of the data, although teachers might have been accustomed to being given tasks within the Chinese culture. In addition, the power dynamics also exists at the moment when the interviews are conducted with teachers. It is assumed that different interviewees will have different responses if they are asked to share their personal understandings of teacher professional development and teaching practices on critical reflection. Therefore, building alliance with those teachers would be crucial (Tanggaard, 2008; 2009). Teachers need to be well informed of what they are expected to contribute to the research.

If you feel you need to discuss any issue further, or to highlight difficulties, please contact the GSoE's ethics co-ordinators who will suggest possible ways forward.

Signed: Dini Jiang (Researcher) Signed: James MacPherson (Discussant)
Date: 15/02/2017


Ethics Online Tool: application signed off Inbox x

Research Governance and Ethics Officer <Liam.McKervey@bristol.ac.uk> 24 Feb (12 days ago)

to dini.jiang

Your online ethics application for your research project "Exploring the Role of Critical Reflection in Promoting Teacher Professional Development and Teacher Effectiveness in Rural Southwest China" has been granted ethical approval. Please ensure that any additional required approvals are in place before you undertake data collection, for example NHS R&D Trust approval, Research Governance Registration or Site Approval.

For your reference, details of your online ethics application can be found online here:

http://www.bristol.ac.uk/red/ethics-online-tool/applications/49301

Appendix 4. Survey Instrument

简介
Introduction

非常感谢您参与此次问卷。您的回答将贡献于英国布里斯托大学教育学院蒋迪尼先生的研究。此研究旨在探索合作反思探究在促进中国西南农村地区教师反思性实践和专业发展中的角色。本问卷包含与反思性实践、专业学习共同体和教师研究参与度等专业发展概念和实践相关的问题。也包含与您在以上教师专业发展实践方面参与度相关的一些问题。
Thank you very much for taking part in this survey. Your responses will contribute to a study conducted by Mr Dini Jiang at the School of Education, University of Bristol, UK. It is exploring the role of collaborative reflective enquiry in promoting teachers' reflective practice and professional development in rural Southwest China. The survey includes questions on professional development concepts and practices associated with reflective practice, professional learning communities and teachers' research engagement. It also contains some questions that assess the extent to which you engage with the above professional development practices.

完成此次问卷不会超过 30 分钟。您的回答将会被严格保密。您和您学校的名字不会在研究相关的任何报告中出现。您的个人信息与回答将不会被分享给任何布里斯托大学以外的人。没有任何您学校的人能够看到您的答案。您的参与全凭自愿。
The survey should take no more than 30 minutes to complete. Your answers will be treated confidentially, which means that you and your school will not be identified in any reports produced from this research. Your personal details and responses will not be shared with anyone outside the University of Bristol and no one within your school will be able to see your answers. Your participation is completely voluntary.

在填写纸质问卷时，请使用黑色签字笔并返还给蒋迪尼先生。非常感谢。
If completing the paper survey, please use black ink and return it to Mr Dini Jiang. Thank you very much.

2017 年 11 月

November 2017

依法享有的权利和同意：您同意参加探索合作反思探究在促进中国西南农村地区教师反思性实践和专业发展中的角色的研究。您不放弃完成问卷以后的任何依法享有的权利。如果您完成问卷，也就意味着您同意参与。

Legal Rights and Consent: You consent to participate in the study of exploring the role of collaborative reflective enquiry in promoting teachers' reflective practice and professional development in rural Southwest China. You are not waiving any of your legal rights by completing this questionnaire. If you complete the questionnaire, your consent will be indicated.

1. 您的性别？Are you male or female?

男 Male □ 0
女 Female □ 1

2. 您的年龄？How old are you?

___岁 Years old

3. 您的最高学历？What is the highest level of education you have completed?

硕士学历及以上 Master's Degree and above □ 0
本科学历 Bachelor's Degree □ 1
大学专科及以下 Diploma and below □ 2

4. 您的职位？（请在最能描述您职位的那个方框里打勾）What is your job role? (Please **tick one box** below that best describes your role)

课堂教师 Classroom teacher □ 0
中层干部（如学科或课程负责人、年级组长）Middle leader (e.g. subject or curriculum area leader, grade leader) □ 1

高层管理人员（如校长、主任、副校长或校长助理）Senior leader (e.g. headteacher, principal, director, deputy or assistant headteacher) □ 2

其他（请注明）Other role (please specify) □ 3

5. 您的职称（请在以下一个方框里打勾）What is your job title? (Please **tick one box** below)

正高级教师'Zheng' senior teacher □ 0

高级教师 Senior teacher □ 1

一级教师'Yi ji' teacher □ 2

二级教师'Er ji' teacher □ 3

三级教师'San ji' teacher □ 4

其他（请注明）Other (please specify) □ 5

6. 您在本学年所教授的科目？ What is the subject you teach in the current academic year?

语文 Chinese □ 0　数学 Maths □ 1　英语 English □ 2

政治 Politics □ 3　历史 History □ 4　地理 Geography □ 5

物理 Physics □ 6　化学 Chemistry □ 7　生物 Biology □ 8

音乐 Music □ 9　体育 PE □ 10　美术 Arts □ 11

其他（请注明）Other (please specify) □ 12

7. 您在教师行业的年限？（请在能描述您整个教学生涯年限的方框里打勾，包含中间间歇的时间）How long have you been in the teaching profession? (Please tick the box that describes the length of your whole teaching career, including career breaks)

30 年及以上 30 years or more □ 0

20-29 年 20-29 years □ 1

10-19 年 10-19 years □ 2

5-9 年 5-9 years □ 3

1-4 年 1-4 years □ 4

教学的第一年 First year of teaching □ 5

教师专业发展 Teacher Professional Development

"专业发展"的定义为提高教师个人技能、知识、专长和其他特质的活动。Professional development is defined as activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher.

8. 在过去的 18 个月里，您是否参加了以下形式的专业发展活动，这些活动对您的教师专业发展是否起到了作用？ During the last 18 months, did you participate in any of the following kinds of professional development activities, and what was the impact of these activities on your development as a teacher?

	是否参加 8.1Participation		是否起到了作用 8.2Impact			
	是 Yes 1	否 No 0	没有作用 No impact 0	小的作用 A small impact 1	一定的作用 A moderate impact 2	大的作用 A large impact 3
8.1.1 / 8.2.1 进修课程／工作坊（比如：关于学科、教学方法或其他教育相关话题）Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)						
8.1.2 / 8.2.2 教育会议或学术讲座（教师或研究人员陈述他们的研究结论并对教育问题进行讨论）Education conferences or seminars (where teachers and/or						

researchers present their research results and discuss educational problems)						
8.1.3 / 8.2.3 资质课程（比如：学历课程）Qualification programme (e.g. a degree programme)						
8.1.4 / 8.2.4 到其他学校观摩参观 Observation visits to other schools						
8.1.5 / 8.2.5 参加教师专业发展专属网络 Participation in a network of teachers formed specifically for the professional development of teachers						
8.1.6 / 8.2.6 针对您感兴趣的话题进行个人或集体研究 Individual or collaborative research on a topic of interest to you professionally						
8.1.7 / 8.2.7 辅导和同事相互观摩或指导，作为学校正式安排的一部分 Mentoring and/or peer observation and coaching, as part of a formal school arrangement						

反思性实践 Reflective Practice

反思性实践是一个诚实地、有深度地和批判性地思考专业实践各个方面的不间断的，动态的过程。Reflective practice is an ongoing, dynamic process of thinking honestly, deeply and critically about all aspects of professional practice.

9. 平均来讲，您多久在学校做以下实践？（请在每一栏的一个方框里打勾）
On average, how often do you do the following in this school? (Please tick one box in each row).

	从不 Never 0	一年 1 次或以下 Once a year or less 1	一年 2-4 次 2-4 times a year 2	一年 5-10 次 5-10 times a year 3	一个月 1-3 次 1-3 times a month 4	一周 1 次或更多 Once a week or more 5
课程评估 Lesson evaluations						
9.1 您多久评估自己的课程？How often do you evaluate your lessons?						
9.2 在进行评估时，您多久思考“为什么”和“那又怎么样”以及发生了什么？In your evaluations how often do you think about ‘why’ and ‘so what’ as well as what happened?						
9.3 您多久由于反思而调整自己的课程？How often do you modify your lessons as a result of reflection?						
倾听其他人的看法 Listening to the view of others						
9.4 您多久跟同事讨论教与学？How often do you talk to a colleague about learning and teaching?						
9.5 您多久将有用的建议付诸行动用以提高自己的实践？How often do you apply wise suggestions to improve your practice?						
9.6 您多久通过向学校以外的组织或者个人学习获得灵感？How often do you ‘look outside’ the school for inspiration?						
9.7 当反思应如何提高教学时，您多久倾听其他人（如学生，教学助理）的看法并采取行动？How often do you listen and act upon the views of						

others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?						
9.8 您和团队或者同事开会时多久会讨论如何提高教学质量？How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?						
参与研究 Engaging with research						
9.9 您多久阅读相关的研究文献？How often do you read relevant research literature?						
9.10 当决定应该采取什么行动时，您多久会比较不同的证据来源？How often do you compare different sources of evidence when deciding what actions to take?						
9.11 您多久由于反思教与学而进行"行动研究"？How often do you undertake action research as a result of reflecting upon learning and teaching?						
专业发展 Professional development						
9.12 您多久评估您的教师专业发展活动，比如参加进修课程？How often do you evaluate your professional development activities, such as attending courses?						
9.13 您多久将专业发展活动中的想法付诸于实践？How often do you incorporate ideas from professional development activities into your practice?						

专业学习共同体 Professional Learning Communities

专业学习共同体指一个享有共同学习愿景的全纳性的群体，在这个群体中，每一个人都相互支持、共同协作，寻找方法探究教学实践问题，共同学习能提高每一个学生学习水平的新的且更好的教学方式。A professional learning community is an inclusive group of people, motivated by a shared learning vision, who support and work with each other, finding ways, inside and outside their immediate community, to enquire on their practice and together learn new and better approaches that will enhance all students' learning.

10. 您从学校其他老师（非管理团队老师）获得以下哪种反馈？（请选择所有适合的）Which, if any, of the following feedback have you received from other teachers (not a part of the management team) in this school? (Please tick all that apply).

10.1 其他老师直接观课的反馈 Feedback following direct observation of your classroom teaching □ 0
10.2 学生问卷对于您教学的反馈 Feedback from student surveys about your teaching □ 1
10.3 测评您目前知识水平的反馈 Feedback following an assessment of your content knowledge □ 2
10.4 根据您学生考试成绩的反馈 Feedback following an analysis of your students' test scores □ 3
10.5 您自我评估的反馈（如一系列自我评估材料）Feedback following your self-assessment of your work (e.g. presentation of a portfolio assessment) □ 4
10.6 来自与家长或监护人的问卷或讨论的反馈 Feedback following surveys or discussions with parents or guardians □ 5

11. 在您看来，当您获得这些反馈时，其主要的侧重点是什么？（请在每一栏的一个方框里打勾）In your opinion, when you receive this feedback, what is the emphasis placed on the following areas? (Please tick one box in each row).

	完全不考虑 Not considered at all 0	考虑，但觉得不是特别重要 Considered with low importance 1	考虑，觉得重要 Considered with moderate importance 2	考虑，觉得非常重要 Considered with high importance 3
11.1 学生表现 Student performance				
11.2 对于我学科领域的知识和理解 Knowledge and				

understanding of my subject fields				
11.3 我学科领域的教学能力 Pedagogical competencies in teaching my subject fields				
11.4 学生评估实践 Student assessment practices				
11.5 学生行为和课堂管理 Student behaviour and classroom management				

12. 关于您在学校收到的反馈，在多大程度上直接导致了以下积极的改变？（请在每一栏的一个方框里打勾）
Concerning the feedback you have received at this school, to what extent has it directly led to a positive change in any of the following? (Please tick one box in each row).

	没有积极的改变 No positive change 0	小的改变 A small change 1	有一定的改变 A moderate change 2	很大的改变 A large change 3
12.1 您的课堂管理实践 Your classroom management practices				
12.2 您主要学科领域的知识和理解 Your knowledge and understanding of your main subject fields				
12.3 您的教学实践 Your teaching practices				
12.4 您教授有特殊需求的学生的教学方法 Your methods for teaching students with special needs				
12.5 您使用学生评估提高学生学习的实践 Your use of student assessment to improve student learning				

13. 平均来讲，您多久在学校做以下实践？（请在每一栏的一个方框里打勾）On average, how often do you do the following in this school? (Please tick one box in each row).

	从不 Never 0	一年 1 次或以下 Once a year or less 1	一年 2-4 次 2-4 times a year 2	一年 5-10 次 5-10 times a year 3	一个月 1-3 次 1-3 times a month 4	一周 1 次或更多 Once a week or more 5
13.1 与同事交换教学材料 Exchange teaching materials with colleagues						
13.2 讨论具体某个学生的学习进度 Engage in discussions about the learning development of specific students						
13.3 和学校的其他老师合作确保对学生进步测评的标准 Work with other teachers in						

my school to ensure common standards in evaluations for assessing student progress						
13.4 参与集体会议 Attend team conferences						

14. 您在多大程度上同意以下适用于您学校的陈述？（请在每一栏的一个方框里打勾）How strongly do you agree with these statements as applied to this school? (Please tick one box in each row)

	非常不同意 Strongly disagree 0	不同意 Disagree 1	同意 Agree 2	非常同意 Strongly agree 3
14.1 学校有针对学校问题共同分担责任的文化 This school has a culture of shared responsibility for school issues				
14.2 学校有相互支持的合作的校园文化 There is a collaborative school culture which is characterised by mutual support				

关于支持学生进步的一种具体方式 About a specific approach to supporting pupils' progress

15. 请在以下方框中列出您在过去两年里使用的支持学生进步的一种具体方式。比如，可以是一种具体的教学方法，或者是一种资源、产品或者行动。Please name in the box below a specific approach that you have used within the last two years to support pupils' progress. For example this could be a teaching method, or a resource, product or initiative.

活动名称或者简介（请在以下方框中书写）Activity name/brief description (please write in the box below)

16. 以下哪些在辨别以上方式时起了重要的作用？如果有任何？（请选择所有适合的）Which, if any, of the following were important in identifying the approach you named above? (Please tick all that apply)

16.1 来自我自己或者学校的想法 Ideas generated by me or my school □ 0
16.2 来自其他学校的想法 Ideas from other schools □ 1
16.3 当地教育局的建议 Advice from my local authority □ 2
16.4 基于学术研究的文章、报告、书籍或者总结（纸质或网络版本）Articles, reports, books or summaries based on academic research (paper or web based) □ 3
16.5 基于教师经验的文章、报告、书籍或者总结（纸质或网络版本）Articles, reports, books or summaries based on teacher experience (paper or web based) □ 4
16.6 校外供应商的促销材料 The promotional materials of an external supplier □ 5
16.7 由我或者同事采取的行动研究 Action research conducted by me or my colleagues □ 6
16.8 通过培训或者继续教育发展获得的信息 Information gathered through training/CPD □ 7
16.9 网络证据平台或者数据库 Online evidence platforms or databases □ 8
16.10 类似于教育部等官方部门的指导 Guidance from official bodies such as MoE □ 9
16.11 考试委员会的指导 Guidance from exam boards □ 10
16.12 不知道 Don't know □ 11
16.13 其他（请注明）Other (please specify) □ 12

17. 请评估以下因素对于您决定采用您的方式时的作用（请在每一栏的一个方框里打勾）。Please rate the level of influence that each of the following factors had on the decision to adopt your approach. (Please tick one box in each row)

我们认为这种方式 We thought the approach	强烈影响 Strong influence	一些影响 Some influence 2	没有影响 No influence 1	不适用 Not applicable 0

	3			
17.1…会很容易实施 would be straightforward to implement				
17.2…有可能在员工中变得流行起来 was likely to be popular with staff				
17.3…有可能在父母中变得流行起来 was likely to be popular with parents				
17.4…有可能在学生中变得流行起来 was likely to be popular with pupils				
17.5…不是太贵 was inexpensive				
17.6…根据学术研究而来 was backed by academic research				
17.7…跟目前已有的实践很吻合 was a good fit with existing practices				
17.8…和咱们的专业实践相一致 aligned with our professional experience				

18. 您认为您的方式到目前为止对支持学生进步有多大的效果？（请仅选一项）How effective do you think your approach has been so far in supporting pupil progress? (Please tick one box only)

非常有效 Very effective □ 5
相当有效 Quite effective □ 4
不是很有效 Not very effective □ 3
一点儿都不有效 Not at all effective □ 2
不知道 Don't know □ 1
太早了，还看不出来 It is too early to tell □ 0

您对于支持学生进步的教与学的总体方式 Your general approach to teaching and learning to support pupils' progress

请您从更广义的角度思考您是怎样提高教学，以支持学生进步的。I would now like you to think more broadly about how you develop your teaching to support pupils' progress.

19. 当您在决定采取方式支持学生进步的时候，您在多大程度上从以下来源获得信息？（请在每一栏的一个方框里打勾）To what extent do you consult the following sources when deciding on your approaches to support pupils' progress? (Please tick one box in each row)

	很多 A lot 2	一点 A little 1	完全没有 Not at all 0
19.1 学生表现数据 Pupil performance data			
19.2 校外组织（如当地教育局或教育部）External organisations (e.g. local authority or MoE)			
19.3 基于学术研究的文章、报告、书籍或者总结（纸质或网络版本）Articles, reports, books or summaries based on academic research (paper or web based)			
19.4 基于教师经验的文章、报告、书籍或者总结（纸质或网络版本）Articles, reports, books or summaries based on teacher experience (paper or web based)			
19.5 通过培训或者继续教育发展获得的信息 Information gathered through training/CPD			
19.6 网络证据平台或者数据库 Online evidence platforms or databases			
19.7 考试委员会的指导 Guidance from exam boards			

19.8 我自己学校的同事 Colleagues within my own school			
19.9 其他学校的同事 Colleagues in other schools			

20. 您觉得有多容易去理解这些来源提供的关于如何支持学生进步方面的信息？（请在每一栏的一个方框里打勾）
How easy do you find it to understand the information that these sources provide about how to support pupils' progress? (Please tick one box in each row)

	很容易 Very easy 4	相当容易 Quite easy 3	不是很容易 Not very easy 2	一点儿都不容易 Not at all easy 1	我不用这些信息来源 I don't use this source 0
20.1 学生表现数据 Pupil performance data					
20.2 校外组织（如当地教育局或教育部） External organisations (e.g. local authority or MoE)					
20.3 基于学术研究的文章、报告、书籍或者总结（纸质或网络版本） Articles, reports, books or summaries based on academic research (paper or web based)					
20.4 基于教师经验的文章、报告、书籍或者总结（纸质或网络版本） Articles, reports, books or summaries based on teacher experience (paper or web based)					
20.5 通过培训或者继续教育发展获得的信息 Information gathered through training/CPD					
20.6 网络证据平台或者数据库 Online evidence platforms or databases					
20.7 考试委员会的指导 Guidance from exam boards					
20.8 我自己学校的同事 Colleagues within my own school					
20.9 其他学校的同事 Colleagues in other schools					

循证教学与使用研究证据 Evidence-based teaching and using evidence from research

21. 这个术语"循证教学"对您来讲是什么意思呢？请选择最多三个最能描述您对于这个术语的理解。What does the term 'evidence-based teaching' mean to you? Please select up to three boxes that best describe your understanding of the term.

21.1 开展行动研究并运用于学习 Conducting action research and applying the learning □ 0
21.2 向同事学习并运用于学习 Learning from colleagues and applying the learning □ 1
21.3 运用教育部的指导 Applying MoE guidance □ 2
21.4 使用网络证据平台或者数据库并运用于学习 Using an online evidence platform/database and applying the learning □ 3
21.5 运用考试委员会的指导 Applying exam board guidance □ 4
21.6 将学术研究证据与我的专业实践经验结合起来 Combining academic research evidence with my professional expertise □ 5
21.7 使用学生表现数据追踪学生进步并提前计划 Using pupil performance data to track pupil progress and plan ahead □ 6
21.8 运用校外供应商的推荐 Applying the recommendations of an external supplier □ 7
21.9 阅读或者运用来自学术研究或与研究人员合作的信息 Reading and applying information from academic research or from working with researchers □ 8
21.10 向校外顾问、培训师或者顾问学习 Learning from external consultants, trainers or advisors □ 9
21.11 我不知道 I don't know □ 10

22. 这个问题旨在了解您是如何在工作中使用研究信息的。这里的"研究"指的是基于研究产生的来自书籍、报告、文章、总结、培训或者活动的信息。This question aims to find out how (if at all) you use research information in your work. By 'research' we mean information from book, reports, articles, summaries, training or events that is based on academic studies.

请表明您对以下陈述的同意程度（请在每一栏的一个方框里打勾）。Please indicate the extent to which you agree with the following statements. (Please tick one box in each row).

	非常不同意 Strongly disagree 0	不同意 Disagree 1	同意 Agree 2	非常同意 Strongly agree 3
22.1 来自研究的信息在启发我的（或者我们）的教学实践方面起着重要的角色 Information from research plays an important role in informing my/our teaching practice				
22.2 我不相信使用来自研究的信息会帮助学生提高成绩 I do not believe that using information from research will help to improve pupil outcomes				
22.3 我知道在哪儿去找到有可能启发教学方法或者实践的相关研究 I know where to find relevant research that may help to inform teaching methods/practice				
22.4 我学校的领导不鼓励我使用来自研究的信息以提高我的实践 My school leaders do not encourage me to use information from research to improve my practice				
22.5 我可以将来自研究的信息与我自己的情境关联起来 I am able to relate information from research to my context				
22.6 我学校的其他同事很少使用来自研究的信息去启发他们的教学实践 Other staff in my school rarely use information from research to inform their teaching practice				
22.7 我知道如何分析来自研究的信息 I feel confident about analysing information from research				

22.8 在其他地方做的研究的信息对我们学校来讲没有太大价值 Information from research conducted elsewhere is of limited value to our school				
22.9 我使用来自研究的信息帮助我决定如何在课堂中实施新的教学方式 I use information from research to help me to decide how to implement new approaches in the classroom				

23. 在过去的一年里，您是怎样使用来自学术研究的信息去启发您的实践的？（请选择所有适合的）In the last year, how (if at all) have you used information from academic research to inform your practice? (Please tick all that apply)

23.1 在过去的一年里，我没有使用来自学术研究的信息 I have not used information from academic research in the last year □ 0

或者，在过去的一年里，我使用了来自学术研究的信息去：Or, in the last year I have used information from academic research to:

23.2 和同事讨论最佳的实践 discuss best practice with colleagues □ 1
23.3 反思我自己的实践 Reflect on my own practice □ 2
23.4 改变课堂实践（这可以是开始、发展或者放弃一种教学方式）change classroom practice (this could be starting, developing or discontinuing an approach) □ 3
23.5 贡献于我自己的研究或者探究 contribute to my own research/enquiry □ 4
23.6 影响同事们改变他们的课堂实践（这可以是开始、发展或者放弃一种教学方式）influence colleagues to change their classroom practice (this could be starting, developing or discontinuing an approach) □ 5
23.7 提升我对于一个话题或者学科的知识水平 improve my knowledge of a topic or subject □ 6

如果您选择了"改变课堂实践"或者"影响同事们改变他们的课堂实践"，请进入问题 24。If you ticked 'change classroom practice' or 'influence colleagues to change their classroom practice', please go to Q24.
如果您没有选择"改变课堂实践"或者"影响同事们改变他们的课堂实践"，请进入问题 25。If you did not tick 'change classroom practice' or 'influence colleagues to change their classroom practice', please go to Q25.

24. 是什么样的研究信息促使您改变课堂实践？（请选择所有适合的）What was it about the research information that enabled you to change classroom practice? (Please tick all that apply)

24.1 它很清晰（如语言、风格和表达）It was clear (e.g. language, style, presentation) □ 0
24.2 它很具有说服力 It was convincing □ 1
24.3 我能够和研究人员或者能懂的其他人员讨论研究 I was able to discuss the research with a researcher or someone else who understood it □ 2
24.4 我可以清晰地看到研究如何与我的情境相关联 I could see clearly how the research related to our context □ 3
24.5 有基于研究的指导和培训 There was coaching and training available based on the research □ 4
24.6 它包含关于如何在课堂中运用研究的实际指导 It contained practical guidance about how to apply the research in the classroom □ 5
24.7 我能够看到研究正在被另一所学校运用 I was able to see the research being applied in another school □ 6
24.8 它鼓励更多合作型的探究 It encouraged collaborative enquiry □ 7
24.9 它有资源支持（比如经费、材料）It was supported by resources (e.g. funding, materials) □ 8
24.10 其他（请说明）Other (please say what) □ 9

25. 以下哪些最能描述您并没有因为研究信息而改变您的课堂实践？（请选择所有适合的）Which of the following best describe why you have not changed classroom practice based on research information?
(Please tick all that apply)

25.1 研究支持我们目前的教学方式 The research supports our existing approach □ 0
25.2 我们仍然在计划改变实践（开始、发展或者放弃一种教学方式）We are still planning changes to practice (either starting, developing or discontinuing an approach) □ 1
25.3 信息不够清晰（比如语言、风格和表达）The information was unclear (e.g. language, style, presentation) □ 2

25.4 信息不具备说服力 The information was not convincing □ 3
25.5 它没有包含关于如何在课堂中运用研究的实际指导 It didn't contain practical guidance about how to apply the research in the classroom □ 4
25.6 没有关于研究是如何在其他学校运用的信息 There was no information about how the research had been applied in other schools □ 5
25.7 我不能和研究人员或者能懂的其他人员讨论研究 I was unable to discuss the research with a researcher or someone else who understood it □ 6
25.8 我不能清晰地看到研究如何与我的情境相关联 I was unable to see clearly how the research related to our context □ 7
25.9 没有基于研究的指导和培训 There was no coaching or training available based on the research □ 8
25.10 缺乏足够的资源（比如实践、员工和经费）去做出改变 We had insufficient resources (e.g. time, staff, budget) to make changes □ 9
25.11 很难说服学校的高层领导 It was difficult to convince school senior leaders □ 10
25.12 很难说服其他员工 It was difficult to convince other staff □ 11
25.13 其他（请说明）Other (Please say what) □ 12

Appendix 5. Sources of Survey Instrument

Source 1. Professional development: TALIS survey (OECD, 2008)
http://www.oecd.org/education/school/TALIS-2008-Teacher-questionnaire.pdf

Concept	**Aspects**	**Items (All exactly the same with the original research)**	**Factor analysis conducted in previous research**	**Plan for data analysis – factor scores and/or items**
Professional development	Participation	Q8 Courses/workshops; Q8 Education conferences or seminars; Q8 Qualification programme; Q8 Observation visits to other schools; Q8 Participation in a network of teachers formed specifically for the professional development of teachers; Q8 Individual or collaborative research on a topic of interest to you professionally; Q8 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	Justification for presenting each item separately is provided by OECD (2008)	Analyse each item separately (two-way ANOVA by school and teacher experience)
	Impact	Q8 Courses/workshops; Q8 Education conferences or seminars; Q8 Qualification programme; Q8 Observation visits to other schools; Q8 Participation in a network of teachers formed specifically for the professional development of teachers; Q8 Individual or collaborative research on a topic of interest to you professionally; Q8 Mentoring and/or peer observation and coaching, as part of a formal school arrangement		Analyse each item separately (two-way ANOVA by school and teacher experience)

Source 2. PLCs: TALIS survey (OECD, 2016, p.150-151)
https://read.oecd-ilibrary.org/education/school-leadership-for-learning_9789264258341-en#page1

Concept	**Scales/dimensions**	**Items (All exactly the same with the original research)**	**Factor analysis**	**Plan for data analysis – factor scores and/or items**
PLCs	Deprivatised practice (feedback from other teachers)	Q10 Feedback following direct observation of your classroom teaching (item TT2G28A5); Q10 Feedback from student surveys about your teaching (item TT2G28B5); Q10 Feedback following an assessment of your content knowledge (item TT2G28C5); Q10 Feedback following an analysis of your students' test scores (item TT2G28D5); Q10 Feedback following your self-assessment of your work (e.g. presentation of a portfolio assessment) (item TT2G28E5); Q10 Feedback following surveys or discussions with parents or guardians (item TT2G28F5).	Justification for using factor scores from exploratory factor analysis is provided by OECD (2016, p.150-151)	Analyse each scale and item separately (two-way ANOVA by school and teacher experience)
	Collective focus on student learning	Q11 Emphasis on Student performance (item TT2G29A); Q11 Emphasis on Knowledge and understanding of my subject fields (item TT2G29B);		

		Q11 Emphasis on Pedagogical competencies in teaching my subject fields (item TT2G29C); Q11 Emphasis on Student assessment practices (item TT2G29D); Q11 Emphasis on Student behaviour and classroom management (item TT2G29E).		
	Reflective dialogue	Q12 Your classroom management practices (item TT2G30H); Q12 Your knowledge and understanding of your main subject fields (item TT2G30I); Q12 Your teaching practices (item TT2G30J); Q12 Your methods for teaching students with special needs (item TT2G30K); Q12 Your use of student assessment to improve student learning (item TT2G30L).		
	Collaborative activity	Q13 Exchange teaching materials with colleagues (TT2G33D); Q13 Engage in discussions about the learning development of specific students (TT2G33E); Q13 Work with other teachers in my school to ensure common standards in evaluations for assessing student progress (TT2G33F); Q13 Attend team conferences (TT2G33G).		
	Shared sense of purpose	Q14 This school has a culture of shared responsibility for school issues (item TT2G44D); Q14 There is a collaborative school culture which is characterised by mutual support (item TT2G44E).		

Source 3. Reflective practice (The Welsh Government, 2015)
https://dera.ioe.ac.uk/23376/2/150611-reflective-practice-booklet-en_Redacted.pdf

Concept	**Dimensions**	**Items (With categories changed to be the same with those of the "collaborative activity" scale in TALIS 2013, i.e. never, once a year or less, 2-4 times a year, 5-10 times a year, 1-3 times a month, and once a week or more)**	**Factor analysis**	**Plan for data analysis – factor scores and/or items**
Reflective practice	Lesson evaluations	Q9 How often do you evaluate your lessons? Q9 In your evaluations how often do you think about 'why' and 'so what' as well as what happened? Q9 How often do you modify your lessons as a result of reflection?	N/A (The Welsh Government, 2015)	Exploratory Factor Analysis used to create 3 scales (justification for this approach can be claimed from the TALIS report above) Collaboration, reflection, use of evidence Analyse each scale and item separately (two-way ANOVA by school and teacher experience)
	Listening to the view of others	Q9 How often do you talk to a colleague about learning and teaching? Q9 How often do you apply wise suggestions to improve your practice? Q9 How often do you 'look outside' the school for inspiration? Q9 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons? Q9 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?		
	Engaging with research	Q9 How often do you read relevant research literature?		

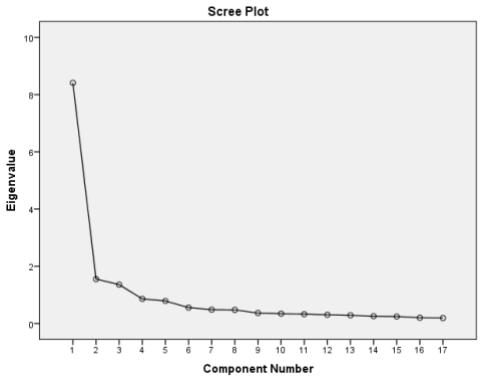
		Q9 How often do you compare different sources of evidence when deciding what actions to take? Q9 How often do you undertake action research as a result of reflecting upon learning and teaching?		
	Professional development	Q9 How often do you evaluate your professional development activities, such as attending courses? Q9 How often do you incorporate ideas from professional development activities into your practice?		

Source 4. Research Engagement: EEF survey (Nelson, Mehta, Sharples & Davey, 2017)
https://educationendowmentfoundation.org.uk/public/files/Evaluation/Research_Use/NFER_Research_Use_pilot_report_-_March_2017_for_publication.pdf

Concept	**Scales**	**Items (Without the 6th scale items)**	**Factor analysis**	**Plan for data analysis – factor scores and/or items**
Research engagement	Positive disposition to academic research in informing teaching practice	Q20 How easy they find it to understand academic research (item 3); Q22 Information from research plays an important role in informing my/our teaching practice (item 1); Q22 I know where to find relevant research that may help to inform teaching methods/practice (item 3); Q22 I am able to relate information from research to my context (item 5); Q22 I feel confident about analysing information from research (item 7); Q22 I use information from research to help me to decide how to implement new approaches in the classroom (item 9).	Justification for using factor scores from exploratory factor analysis is provided by Nelson, Mehta, Sharples and Davey (2017)	Analyse each scale and item separately (two-way ANOVA by school and teacher experience)
	Use of academic research to inform selection of teaching approaches	Q16 Academic research was important in identifying a specific approach and they used CPD based on academic research (item 4); Q17 The extent to which the decision to adopt an approach was due to it being based on academic research (item 6); Q19 The extent to which they consult academic research (generally) (item 3).		
	Perception that academic research is not useful to teaching	Q22 I do not believe that using information from research will help to improve pupil outcomes (item 2); Q22 Information from research conducted elsewhere is of limited value to our school (item 8).		
	Perception that own school does not encourage use of academic research	Q22 My school leaders/governors do not encourage me to use information from research to improve my practice (item 4); Q22 Other staff in my school rarely use information from research to inform their teaching practice (item 6).		
	Active engagement with online evidence platforms	Q19 The extent to which they consult online platforms (generally) (item 6); Q20 How easy they find it to understand online platforms (item 6).		

Appendix 6. Technical Details of Factor Analysis on Collaborative Reflective Enquiry

An exploratory factor analysis was conducted to investigate the dimensions of collaborative reflective enquiry, based on 17 items with a six-point Likert Scale of "never", "once a year or less", "2-4 times a year", "5-10 times a year", "1-3 times a month" and "once a week or more". No items regarding collaborative reflective enquiry were excluded on the basis of multicollinearity or singularity, as the determinant value of the R-matrix was 1.311E-5 (which is 0.00001311) which was greater than the necessary value of 0.00001. The sample size was adequate. The value of the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.926 (greater than 0.5), indicating that patterns of correlations were relatively compact and factor analysis could yield distinct and reliable factors. The Bartlett's test was highly significant ($p<0.001$). Overall, three factors were retained (see the scree plot shown below). Factor 1 accounted for considerably more variance, before rotation, than the remaining two (49.468% compared to 9.131 and 7.992%), however after extraction it accounted for only 25.923% of variance (compared to 24.105 and 16.563%).



A Varimax orthogonal rotation was used based on the assumption that the factors were independent. This rotation had sums of squared loadings ranging from 2.816 to 4.407. The collaboration construct had a Cronbach's alpha of .834. The construct of use of research and evidence had a Cronbach's alpha of .894, and the reflection construct had a Cronbach's alpha of .901. The overall construct of collaborative enquiry had a Cronbach's alpha of .933.

Factor loadings for each individual item

Items	M (SD)	Factor loadings		
		Factor 1	Factor 2	Factor 3
Factor 1: Reflection (α=.901)				
9.4 How often do you talk to a colleague about learning and teaching?	4.24 (1.195)	.789		
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?	3.69 (1.463)	.785		
9.3 How often do you modify your lessons as a result of reflection?	3.82 (1.365)	.766		
9.1 How often do you evaluate your lessons?	3.54 (1.490)	.737		
9.5 How often do you apply wise suggestions to improve your practice?	3.98 (1.239)	.714		
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	4.03 (1.374)	.646		
9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?	3.97 (1.278)	.613		
Factor 2: Use of research and evidence (α=.894)				
9.9 How often do you read relevant research literature?	3.09 (1.516)		.791	
9.12 How often do you evaluate your professional development activities, such as attending courses?	2.99 (1.519)		.786	
9.10 How often do you compare different sources of evidence when deciding what actions to take?	3.32 (1.465)		.785	
9.13 How often do you incorporate ideas from professional development activities into your practice?	3.36 (1.506)		.748	

9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?	3.58 (1.411)	.677	
9.6 How often do you 'look outside' the school for inspiration?	3.27 (1.531)	.536	
Factor 3: Collaboration (α=.834)			
13.2 Engage in discussions about the learning development of specific students	3.99 (1.200)		.781
13.3 Work with other teachers in my school to ensure common standards in evaluations for assessing student progress	3.72 (1.336)		.765
13.1 Exchange teaching materials with colleagues	3.76 (1.468)		.743
13.4 Attend team conferences	4.31 (1.090)		.717

Total N=355; M= Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more); SD=Standard Deviation

Appendix 7. Summary of Raw Data – Quantitative

1. Are you male or female?		
	N	%
Male	168	47.6
Female	**185**	**52.4**
Total	353	100

Total N=355; Missing N=2

3. What is the highest level of education you have completed?		
	N	%
Master's Degree and above	19	5.6
Bachelor's Degree	**293**	**86.4**
Diploma and below	27	8.0
Total	339	100

Total N=355; Missing N=16

4. What is your job role?		
	N	%
Classroom teacher	**286**	**82.7**
Middle leader (e.g. subject or curriculum area leader, grade leader)	44	12.7
Senior leader (e.g. headteacher, principal, director, deputy or assistant headteacher)	10	2.9
Other role (please specify)	6	1.7
Total	346	100

Total N=355; Missing N=9

5. What is your job title?		
	N	%
'Zheng' senior teacher	10	2.8
Senior teacher	109	30.8
'Yi ji' (First Grade) teacher	**147**	**41.5**
'Er ji' (Second Grade) teacher	64	18.1
San ji' (Third Grade) teacher	13	3.7
Other (please specify)	11	3.1
Total	354	100

Total N=355; Missing N=1

6. What is the subject you teach in the current academic year?		
	N	%
Chinese	**64**	**18.3**
Maths	**95**	**27.2**
English	**62**	**17.8**
Politics	13	3.7
History	24	6.9
Geography	15	4.3
Physics	20	5.7
Chemistry	15	4.3
Biology	20	5.7
Music	7	2.0
PE	4	1.1
Arts	6	1.7
Other (please specify)	4	1.1
Total	349	100

Total N=355; Missing N=6

7. How long have you been in the teaching profession?		
	N	%
First year of teaching	16	4.7
1-4 years	59	17.4

5-9 years	36	10.6
10-19 years	**106**	**31.3**
20-29 years	88	26.0
30 years or more	34	10.0
Total	339	100

Total N=355; Missing N=16

8. During the last 18 months, did you participate in any of the following kinds of professional development activities, and what was the impact of these activities on your development as a teacher?

	8.1 Participation						8.2 Impact							
	No	**Yes**	Total valid responses	Missing	Mean (Min=0; Max=1)	SD	No impact	A small impact	**A moderate impact**	A large impact	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)			N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
8.1.1 / 8.2.1 Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	24 (7.3)	**306 (92.7)**	330 (100)	25 (7.0)	**0.93**	0.260	3 (1.1)	52 (18.2)	**170 (59.6)**	60 (21.1)	285 (100)	70 (19.7)	2.01	0.661
8.1.2 / 8.2.2 Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational problems)	50 (16.9)	**245 (83.1)**	295 (100)	60 (16.9)	**0.83**	0.376	2 (0.9)	40 (17.2)	**139 (59.9)**	51 (22.0)	232 (100)	123 (34.6)	2.03	0.654
8.1.3 / 8.2.3 Qualification programme (e.g. a degree programme)	99 (39.9)	149 (60.1)	248 (100)	107 (30.1)	0.60	0.491	1 (0.8)	22 (17.2)	63 (49.2)	42 (32.8)	128 (100)	227 **(63.9)**	**2.14**	0.718
8.1.4 / 8.2.4 Observation visits to other schools	59 (21.7)	213 (78.3)	272 (100)	83 (23.4)	0.78	0.413	3 (1.6)	32 (17.2)	**100 (53.8)**	51 (27.4)	186 (100)	169 (47.6)	2.07	0.713
8.1.5 / 8.2.5 Participation in a network of teachers formed specifically for the professional development of teachers	55 (19.2)	232 (80.8)	287 (100)	68 (19.2)	0.81	0.394	4 (2.0)	51 (25.4)	**95 (47.3)**	51 (25.4)	201 (100)	154 (43.4)	1.96	0.767
8.1.6 / 8.2.6 Individual or collaborative research on a topic of interest to you professionally	94 (35.6)	170 (64.4)	264 (100)	91 (25.6)	0.64	0.480	0 (0.0)	26 (17.3)	69 (46.0)	55 (36.7)	150 (100)	205 **(57.7)**	**2.19**	0.711
8.1.7 / 8.2.7 Mentoring and/or peer observation and coaching, as part of a formal school arrangement	38 (12.9)	**256 (87.1)**	294 (100)	61 (17.2)	**0.87**	0.336	1 (0.4)	35 (15.3)	**111 (48.5)**	82 (35.8)	229 (100)	126 (35.5)	**2.20**	0.701

Note: Total N=355.

M=Mean (Participation: 0=No, 1=Yes; Impact: 0=No impact; 1= A small impact; 2= A moderate impact; 3= A large impact)

SD=Standard Deviation

9. On average, how often do you do the following in this school?										
	Never	Once a year or less	2-4 times a year	5-10 times a year	1-3 times a month	**Once a week or more**	Total valid responses	Missing	Mean (Min=0; Max=5)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
9.1 How often do you evaluate your lessons?	8 (2.3)	42 (12.3)	48 (14.0)	19 (5.6)	111 (32.5)	**114 (33.3)**	342 (100)	13 (3.7)	3.54	1.490
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?	3 (0.9)	44 (12.9)	36 (10.5)	33 (9.6)	84 (24.6)	**142 (41.5)**	342 (100)	13 (3.7)	3.69	1.463
9.3 How often do you modify your lessons as a result of reflection?	4 (1.2)	29 (8.4)	35 (10.2)	37 (10.8)	91 (26.5)	**148 (43.0)**	344 (100)	11 (3.1)	3.82	1.365
9.4 How often do you talk to a colleague about learning and teaching?	3 (0.9)	16 (4.6)	21 (6.0)	28 (8.0)	68 (19.5)	**213 (61.0)**	349 (100)	6 (1.7)	**4.24**	1.195
9.5 How often do you apply wise suggestions to improve your practice?	3 (0.9)	23 (6.7)	21 (6.1)	37 (10.7)	109 (31.6)	**152 (44.1)**	345 (100)	10 (2.8)	**3.98**	1.239
9.6 How often do you 'look outside' the school for inspiration?	12 (3.5)	52 (15.2)	44 (12.9)	52 (15.2)	88 (25.7)	**94 (27.5)**	342 (100)	13 (3.7)	3.27	1.531
9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?	4 (1.2)	21 (6.5)	22 (6.8)	37 (11.4)	90 (27.8)	**150 (46.3)**	324 (100)	31 (8.7)	3.97	1.278
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	8 (2.4)	28 (8.3)	12 (3.5)	30 (8.8)	81 (23.9)	**180 (53.1)**	339 (100)	16 (4.5)	**4.03**	1.374
9.9 How often do you read relevant research literature?	18 (5.6)	42 (13.1)	53 (16.6)	52 (16.3)	**89 (27.8)**	66 (20.6)	320 (100)	35 (9.9)	3.09	1.516
9.10 How often do you compare different sources of evidence when deciding what actions to take?	15 (4.5)	33 (9.9)	48 (14.4)	55 (16.5)	**99 (29.7)**	83 (24.9)	333 (100)	22 (6.2)	3.32	1.465
9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?	4 (1.2)	38 (11.1)	46 (13.5)	34 (10.0)	106 (31.1)	**113 (33.1)**	341 (100)	14 (3.9)	3.58	1.411
9.12 How often do you evaluate your professional development activities, such as attending courses?	16 (4.7)	60 (17.7)	48 (14.2)	68 (20.1)	**80 (23.6)**	67 (19.8)	339 (100)	16 (4.5)	2.99	1.519
9.13 How often do you incorporate ideas from professional development activities into your practice?	18 (5.3)	38 (11.2)	32 (9.5)	54 (16.0)	**107 (31.7)**	89 (26.3)	338 (100)	17 (4.8)	3.36	1.506

Total N=355
M=Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more)
SD=Standard Deviation

10. Which, if any, of the following feedback have you received from other teachers (not a part of the management team) in this school?		
	N	%
10.1 Feedback following direct observation of your classroom teaching	**179**	**79.6**
10.2 Feedback from student surveys about your teaching	127	56.4

10.3 Feedback following an assessment of your content knowledge	116	51.6
10.4 Feedback following an analysis of your students' test scores	**168**	**74.7**
10.5 Feedback following your self-assessment of your work (e.g. presentation of a portfolio assessment)	**143**	**63.6**
10.6 Feedback following surveys or discussions with parents or guardians	107	47.6

Total N=355; Missing N=130

11. In your opinion, when you receive this feedback, what is the emphasis placed on the following areas?

	Not considered at all	Considered with low importance	Considered with moderate importance	**Considered with high importance**	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
11.1 Student performance	5 (1.4)	22 (6.3)	156 (44.4)	**168 (47.9)**	351 (100)	4 (1.1)	2.39	0.670
11.2 Knowledge and understanding of my subject fields	0 (0)	27 (7.8)	153 (44.1)	**167 (48.1)**	347 (100)	8 (2.3)	**2.40**	0.630
11.3 Pedagogical competencies in teaching my subject fields	1 (0.3)	26 (7.5)	147 (42.4)	**173 (49.9)**	347 (100)	8 (2.3)	**2.42**	0.642
11.4 Student assessment practices	2 (0.6)	29 (8.5)	**166 (48.7)**	144 (42.2)	341 (100)	14 (3.9)	2.33	0.653
11.5 Student behaviour and classroom management	2 (0.6)	23 (6.6)	132 (37.8)	**192 (55.0)**	349 (100)	6 (1.7)	**2.47**	0.645

Total N=355

M=Mean (0= Not considered at all; 1= Considered with low importance; 2= Considered with moderate importance; 3= Considered with high importance)

SD=Standard Deviation

12. Concerning the feedback you have received at this school, to what extent has it directly led to a positive change in any of the following?

	No positive change	A small change	**A moderate change**	A large change	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
12.1 Your classroom management practices	12 (3.4)	44 (12.6)	**206 (58.9)**	88 (25.1)	350 (100)	5 (1.4)	2.06	0.716
12.2 Your knowledge and understanding of your main subject fields	5 (1.4)	51 (14.6)	**192 (55.0)**	101 (28.9)	349 (100)	6 (1.7)	**2.11**	0.694
12.3 Your teaching practices	4 (1.2)	44 (12.8)	**190 (55.2)**	106 (30.8)	344 (100)	11 (3.1)	**2.16**	0.678
12.4 Your methods for teaching students with special needs	8 (2.3)	66 (18.9)	**181 (51.7)**	95 (27.1)	350 (100)	5 (1.4)	2.04	0.743
12.5 Your use of student assessment to improve student learning	11 (3.1)	46 (13.1)	**193 (55.1)**	100 (28.6)	350 (100)	5 (1.4)	**2.09**	0.732

Total N=355

M=Mean (0= No positive change; 1= A small change; 2= A moderate change; 3= A large change)
SD=Standard Deviation

13. On average, how often do you do the following in this school?										
	Never	Once a year or less	2-4 times a year	5-10 times a year	1-3 times a month	**Once a week or more**	Total valid responses	Missing	Mean (Min=0; Max=5)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
13.1 Exchange teaching materials with colleagues	12 (3.4)	30 (8.6)	29 (8.3)	40 (11.5)	86 (24.6)	**152 (43.6)**	349 (100)	6 (1.7)	**3.76**	1.468
13.2 Engage in discussions about the learning development of specific students	4 (1.1)	18 (5.1)	24 (6.9)	34 (9.7)	123 (35.1)	**147 (42.0)**	350 (100)	5 (1.4)	**3.99**	1.200
13.3 Work with other teachers in my school to ensure common standards in evaluations for assessing student progress	11 (3.1)	22 (6.3)	30 (8.5)	44 (12.5)	**129 (36.6)**	116 (33.0)	352 (100)	3 (0.8)	3.72	1.336
13.4 Attend team conferences	1 (0.3)	12 (3.5)	19 (5.5)	29 (8.4)	70 (20.2)	**216 (62.2)**	347 (100)	8 (2.3)	**4.31**	1.090

Total N=355
M=Mean (0=Never; 1= Once a year or less; 2=2-4 times a year; 3=5-10 times a year; 4=1-3 times a month; 5= Once a week or more)
SD=Standard Deviation

14. How strongly do you agree with these statements as applied to this school?								
	Strongly disagree	Disagree	**Agree**	Strongly agree	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
14.1 This school has a culture of shared responsibility for school issues	7 (2.0)	19 (5.4)	**245 (70.0)**	79 (22.6)	350 (100)	5 (1.4)	2.13	0.586
14.2 There is a collaborative school culture which is characterised by mutual support	8 (2.3)	27 (7.7)	**204 (58.3)**	111 (31.7)	350 (100)	5 (1.4)	**2.19**	0.670

Total N=355
M=Mean (0=Strongly disagree; 1= Disagree; 2=Agree; 3=Strongly agree)
SD=Standard Deviation

16. Which, if any, of the following were important in identifying the approach you named above?		
	N	%
16.1 Ideas generated by me or my school	**247**	**77.2**
16.2 Ideas from other schools	79	24.7
16.3 Advice from my local authority	149	46.6
16.4 Articles, reports, books or summaries based on academic research (paper or web based)	**177**	**55.3**
16.5 Articles, reports, books or summaries based on teacher experience (paper or web based)	**176**	**55.0**
16.6 The promotional materials of an external supplier	45	14.1
16.7 Action research conducted by me or my colleagues	174	54.4
16.8 Information gathered through training/CPD	171	53.4
16.9 Online evidence platforms or databases	157	49.1
16.10 Guidance from official bodies such as MoE	136	42.5
16.11 Guidance from exam boards	126	39.4

16.12 Don't know	19	5.9
16.13 Other (please specify)	9	2.8

Total N=355; Missing N=35

17. Please rate the level of influence that each of the following factors had on the decision to adopt your approach.								
We thought the approach	Not applicable	No influence	**Some influence**	Strong influence	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
17.1…would be straightforward to implement	6 (1.7)	25 (7.2)	**271 (77.9)**	46 (13.2)	348 (100)	7 (2.0)	2.03	0.523
17.2…was likely to be popular with staff	3 (0.9)	47 (13.6)	**221 (64.1)**	74 (21.4)	345 (100)	10 (2.8)	2.06	0.619
17.3…was likely to be popular with parents	9 (2.7)	53 (15.7)	**184 (54.6)**	91 (27.0)	337 (100)	18 (5.1)	2.06	0.730
17.4…was likely to be popular with pupils	7 (2.0)	31 (8.9)	**189 (54.5)**	120 (34.6)	347 (100)	8 (2.3)	**2.22**	0.686
17.5…was inexpensive	16 (4.9)	53 (16.2)	**187 (57.0)**	72 (22.0)	328 (100)	27 (7.6)	1.96	0.759
17.6…was backed by academic research	11 (3.3)	42 (12.5)	**190 (56.5)**	93 (27.7)	336 (100)	19 (5.4)	2.09	0.726
17.7…was a good fit with existing practices	8 (2.3)	38 (11.0)	**174 (50.6)**	124 (36.0)	344 (100)	11 (3.1)	**2.20**	0.724
17.8…aligned with our professional experience	12 (3.5)	34 (9.9)	**179 (52.2)**	118 (34.4)	343 (100)	12 (3.4)	**2.17**	0.744

Total N=355
M=Mean (0=Not applicable; 1= No influence; 2=Some influence; 3=Strong influence)
SD=Standard Deviation

18. How effective do you think your approach has been so far in supporting pupil progress?		
	N	%
It is too early to tell	12	3.4
Don't know	6	1.7
Not at all effective	0	0.0
Not very effective	60	16.9
Quite effective	145	40.8
Very effective	68	19.2
No response	64	18.0
Total	355	100

Total=355; Missing N=64

19. To what extent do you consult the following sources when deciding on your approaches to support pupils' progress?							
	Not at all	A little	**A lot**	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)		
19.1 Pupil performance data	5 (1.4)	108 (31.3)	**232 (67.2)**	345 (100)	10 (2.8)	**1.66**	0.505
19.2 External organisations (e.g. local authority or MoE)	45 (13.2)	**188 (55.3)**	107 (31.5)	340 (100)	15 (4.2)	1.18	0.644
19.3 Articles, reports, books or summaries based on academic research (paper or web based)	36 (10.4)	**167 (48.3)**	143 (41.3)	346 (100)	9 (2.5)	1.31	0.650
19.4 Articles, reports, books or summaries based on teacher experience (paper or web based)	17 (4.9)	160 (46.4)	**168 (48.7)**	345 (100)	10 (2.8)	**1.44**	0.588
19.5 Information gathered through training/CPD	24 (6.9)	155 (44.4)	**170 (48.7)**	349 (100)	6 (1.7)	**1.42**	0.618

19.6 Online evidence platforms or databases	36 (12.7)	**141 (49.6)**	107 (37.7)	284 (100)	71 (20.0)	1.25	0.665
19.7 Guidance from exam boards	49 (15.0)	**220 (67.3)**	58 (17.7)	327 (100)	28 (7.9)	1.03	0.572
19.8 Colleagues within my own school	13 (3.9)	**170 (51.1)**	150 (45.0)	333 (100)	22 (6.2)	1.41	0.567
19.9 Colleagues in other schools	46 (13.9)	**217 (65.4)**	69 (20.8)	332 (100)	23 (6.5)	1.07	0.585

Total N=355
M=Mean (0=Not at all; 1=A little; 2=A lot)
SD=Standard Deviation

20. How easy do you find it to understand the information that these sources provide about how to support pupils' progress? (percentage of those who used these sources)

	I don't use this source	Not at all easy	Not very easy	Quite easy	Very easy	Total valid responses	Missing	Mean (Min=0; Max=4)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
20.1 Pupil performance data	6 (1.8)	10 (2.9)	93 (27.3)	93 (27.3)	**139 (40.8)**	341 (100)	14 (3.9)	**3.02**	0.979
20.2 External organisations (e.g. local authority or MoE)	6 (1.8)	26 (7.6)	**142 (41.8)**	117 (34.4)	49 (14.4)	340 (100)	15 (4.2)	2.52	0.894
20.3 Articles, reports, books or summaries based on academic research (paper or web based)	11 (3.2)	34 (9.9)	**133 (38.9)**	93 (27.2)	71 (20.8)	342 (100)	13 (3.7)	2.52	1.029
20.4 Articles, reports, books or summaries based on teacher experience (paper or web based)	6 (2.1)	22 (7.7)	86 (30.3)	**103 (36.3)**	67 (23.6)	284 (100)	71 (20.0)	2.71	0.980
20.5 Information gathered through training/CPD	7 (2.1)	30 (8.9)	93 (27.7)	**109 (32.4)**	97 (28.9)	336 (100)	19 (5.4)	**2.77**	1.030
20.6 Online evidence platforms or databases	18 (5.4)	35 (10.5)	90 (26.9)	**111 (33.2)**	80 (24.0)	334 (100)	21 (5.9)	2.60	1.121
20.7 Guidance from exam boards	11 (3.3)	53 (15.9)	86 (25.8)	**113 (33.9)**	70 (21.0)	333 (100)	22 (6.2)	2.53	1.091
20.8 Colleagues within my own school	1.2	7.7	22.8	**37.7**	30.6	337 (100)	18 (5.1)	**2.89**	0.969
20.9 Colleagues in other schools	5.7	11.4	**32.4**	32.1	18.3	333 (100)	22 (6.2)	2.46	1.090

Total N=355
M=Mean (0=I don't use this source; 1=Not at all easy; 2=Not very easy; 3=Quite easy; 4=Very easy)
SD=Standard Deviation

21. What does the term 'evidence-based teaching' mean to you?

	N	%
21.1 Conducting action research and applying the learning	**140**	**47.0**
21.2 Learning from colleagues and applying the learning	**156**	**52.3**

21.3 Applying MoE guidance	67	22.5
21.4 Using an online evidence platform/database and applying the learning	**174**	**58.4**
21.5 Applying exam board guidance	21	7.0
21.6 Combining academic research evidence with my professional expertise	111	37.2
21.7 Using pupil performance data to track pupil progress and plan ahead	123	41.3
21.8 Applying the recommendations of an external supplier	12	4.0
21.9 Reading and applying information from academic research or from working with researchers	25	8.4
21.10 Learning from external consultants, trainers or advisors	15	5.0
21.11 I don't know	7	2.3

Total N=355; Missing N=57

22. How (if at all) you use research information in your work?								
	Strongly disagree	Disagree	Agree	Strongly agree	Total valid responses	Missing	Mean (Min=0; Max=3)	SD
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
22.1 Information from research plays an important role in informing my/our teaching practice	30 (8.7)	28 (8.1)	**191 (55.4)**	96 (27.8)	345 (100)	10 (2.8)	**2.02**	0.842
22.3 I know where to find relevant research that may help to inform teaching methods/practice	28 (8.2)	50 (14.6)	**167 (48.7)**	98 (28.6)	343 (100)	12 (3.4)	**1.98**	0.872
22.5 I am able to relate information from research to my context	26 (7.6)	45 (13.1)	**176 (51.3)**	96 (28.0)	343 (100)	12 (3.4)	**2.00**	0.846
22.7 I feel confident about analysing information from research	28 (8.2)	69 (20.3)	**149 (43.8)**	94 (27.6)	340 (100)	15 (4.2)	1.91	0.896
22.9 I use information from research to help me to decide how to implement new approaches in the classroom	30 (8.7)	52 (15.1)	**161 (46.7)**	102 (29.6)	345 (100)	10 (2.8)	1.97	0.892
22.2 I do not believe that using information from research will help to improve pupil outcomes	95 (27.7)	**125 (36.4)**	95 (27.7)	28 (8.2)	343 (100)	12 (3.4)	1.16	0.925
22.4 My school leaders do not encourage me to use information from research to improve my practice	106 (31.0)	**128 (37.4)**	87 (25.4)	21 (6.1)	342 (100)	13 (3.7)	1.07	0.899
22.6 Other staff in my school rarely use information from research to inform their teaching practice	95 (27.6)	**116 (33.7)**	106 (30.8)	27 (7.8)	344 (100)	11 (3.1)	1.19	0.930
22.8 Information from research conducted elsewhere is of limited value to our school	101 (29.8)	**107 (31.6)**	104 (30.7)	27 (8.0)	339 (100)	16 (4.5)	1.17	0.947

Total N=355
M=Mean (0=Strongly disagree; 1= Disagree; 2=Agree; 3=Strongly agree)
SD=Standard Deviation

23. In the last year, how (if at all) have you used information from academic research to inform your practice?		
	N	%
23.1 I have not used information from academic research in the last year	66	21.2
23.2 I have used information from academic research to discuss best practice with colleagues	**243**	**77.9**
23.3 I have used information from academic research to reflect on my own practice	**179**	**57.4**

23.4 I have used information from academic research to change classroom practice (this could be starting, developing or discontinuing an approach)	**167**	**53.5**
23.5 I have used information from academic research to contribute to my own research/enquiry	129	41.3
23.6 I have used information from academic research to influence colleagues to change their classroom practice (this could be starting, developing or discontinuing an approach)	118	37.8
23.7 I have used information from academic research to improve my knowledge of a topic or subject	62	19.9

Total N=355; Missing N=43

24. What was it about the research information that enabled you to change classroom practice?		
	N	%
24.1 It was clear (e.g. language, style, presentation)	**171**	**63.8**
24.2 It was convincing	**166**	**61.9**
24.3 I was able to discuss the research with a researcher or someone else who understood it	65	24.3
24.4 I could see clearly how the research related to our context	**157**	**58.6**
24.5 There was coaching and training available based on the research	145	54.1
24.6 It contained practical guidance about how to apply the research in the classroom	143	53.4
24.7 I was able to see the research being applied in another school	39	14.6
24.8 It encouraged collaborative enquiry	80	29.9
24.9 It was supported by resources (e.g. funding, materials)	46	17.2
24.10 Other (please say what)	8	3.0

Total N=355; Missing N=87

Appendix 8. Two-way ANOVA Results (Items by School & Teacher Experience)

Two-way ANOVA Results (Items by School & Teacher Experience)

Survey items	Two-way ANOVA			One-way AVOVA	
	School (A, B & C), p<0.05	**Experience (Less than 4 years, 5-19 years & 20 years or more), p<0.05**	**Interaction, p<0.05**	**School (A, B & C), p<0.05**	**Experience (Less than 4 years, 5-19 years & 20 years or more), p<0.05**
Professional development					
8. Professional development (Participation)					
8.1.1 Courses/workshops	√ (A<C)			√ (A<C)	
8.1.2 Education conferences or seminars					
8.1.3 Qualification programme	√ (A<C)	√ (Less than 4 years <20 years or more)	√	√ (A<C)	√ (Less than 4 years <20 years or more)
8.1.4 Observation visits to other schools		√ (Less than 4 years <20 years or more)			√ (Less than 4 years <20 years or more)
8.1.5 Participation in a network of teachers					
8.1.6 Individual or collaborative research on a topic of interest to you professionally	√ (AB<C)		√	√ (AB<C)	
8.1.7 Mentoring and/or peer observation and coaching	√ (A<C)	√ (Less than 4 years < 5-19 years, 20 years or more)		√ (A<C)	√ (Less than 4 years < 5-19 years, 20 years or more)
8. Professional development (Impact)					
8.2.1 Courses/workshops	√ (A<B, B<C, A<C)			√ (A<B, B<C, A<C)	
8.2.2 Education conferences or seminars	√ (AB<C)			√ (AB<C)	
8.2.3 Qualification programme	√ (AB<C)			√ AB<C)	
8.2.4 Observation visits to other schools	√ (AB<C)			√ (AB<C)	
8.2.5 Participation in a network of teachers	√ (AB<C)			√ (AB<C)	
8.2.6 Individual or collaborative research on a topic of interest to you professionally	√ (AB<C)			√ (AB<C)	
8.2.7 Mentoring and/or peer observation and coaching	√ (AB<C)			√ (AB<C)	
Reflective practice					
9. On average, how often do you do the following in this school?					
9.1 How often do you evaluate your lessons?					
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?					
9.3 How often do you modify your lessons as a result of reflection?				√ (A<C)	
9.4 How often do you talk to a colleague about learning and teaching?					
9.5 How often do you apply wise suggestions to improve your practice?					
9.6 How often do you 'look outside' the school for inspiration?					

9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?					
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	√ (AB>C)			√ (AB>C)	
9.9 How often do you read relevant research literature?					√ (Less than 4 years > 5-19 years)
9.10 How often do you compare different sources of evidence when deciding what actions to take?	√ (A<C)			√ (A<C)	
9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?					
9.12 How often do you evaluate your professional development activities, such as attending courses?	√ (A<C)			√ (A<BC)	
9.13 How often do you incorporate ideas from professional development activities into your practice?	√ (A<C)			√ (A<C)	
PLCs					
10. Deprivatised practice (Please tick all that apply)					
10.1 Feedback following direct observation of your classroom teaching	√ (AB<C)			√ (AB<C)	
10.2 Feedback from student surveys about your teaching	√ (AB<C)			√ (AB<C)	
10.3 Feedback following an assessment of your content knowledge	√ (B<A, A<C, B<C)			√ (B<A, A<C, B<C)	
10.4 Feedback following an analysis of your students' test scores	√ (AB<C)	√ (Less than 4 years < 5-19 years, 20 years or more)		√ (AB<C)	√ (Less than 4 years < 5-19 years, 20 years or more)
10.5 Feedback following your self-assessment of your work	√ (AB<C)			√ (AB<C)	
10.6 Feedback following surveys or discussions with parents or guardians	√ (AB<C)		√	√ (AB<C)	
11. Collective focus on student learning					
11.1 Student performance	√ (B<C)			√ (B<C)	
11.2 Knowledge and understanding of my subject fields	√ (AB<C)			√ (AB<C)	
11.3 Pedagogical competencies in teaching my subject fields	√ (AB<C)			√ (AB<C)	
11.4 Student assessment practices	√ (AB<C)			√ (AB<C)	
11.5 Student behaviour and classroom management	√ (B<C)			√ (B<C)	
12. Reflective dialogue					
12.1 Your classroom management practices	√ (AB<C)			√ (AB<C)	
12.2 Your knowledge and understanding of your main subject fields	√ (A<C)			√ (B<C)	
12.3 Your teaching practices	√ (AB<C)			√ (A<C)	
12.4 Your methods for teaching students with special needs	√ (AB<C)	√ (Less than 4 years <20 years or more)		√ (AB<C)	√ (Less than 4 years <20 years or more)
12.5 Your use of student assessment to improve student learning					
13. Collaborative activity					
13.1 Exchange teaching materials with colleagues					
13.2 Engage in discussions about the learning development of specific students	√ (A<BC)			√ (A<BC)	
13.3 Work with other teachers in my school to ensure common standards in evaluations					
13.4 Attend team conferences					
14. Shared sense of purpose					
14.1 This school has a culture of shared responsibility for school issues	√ (B<C)			√ (B<C)	

14.2 There is a collaborative school culture which is characterised by mutual support	√ (AB<C)		√	√ (AB<C)	
Research Engagement					
16. Which, if any, of the following were important (Please tick all that apply)					
16.1 Ideas generated by me or my school	√ (AB<C)			√ (AB<C)	
16.2 Ideas from other schools					
16.3 Advice from my local authority	√ (AB<C)		√	√ (AB<C)	
16.4 Articles, reports, books or summaries based on academic research	√ (AB<C)			√ (AB<C)	
16.5 Articles, reports, books or summaries based on teacher experience	√ (B<A, A<C, B<C)		√	√ (AB<C)	
16.6 The promotional materials of an external supplier					
16.7 Action research conducted by me or my colleagues	√ (AB<C)			√ (AB<C)	
16.8 Information gathered through training/CPD	√ (B<A, A<C, B<C)			√ (B<A, A<C, B<C)	
16.9 Online evidence platforms or databases	√ (AB<C)			√ (AB<C)	
16.10 Guidance from official bodies such as MoE	√ (AB<C)			√ (AB<C)	
16.11 Guidance from exam boards	√ (AB<C)			√ (AB<C)	
16.12 Don't know	√ (A>BC)			√ (A>C)	
16.13 Other (please specify)					
17. Please rate the level of influence that each of the following factors had on the decision to adopt your approach					
17.1 would be straightforward to implement					
17.2 was likely to be popular with staff	√ (AB<C)			√ (AB<C)	
17.3 was likely to be popular with parents	√ (AB<C)			√ (A<B, B<C, A<C)	
17.4 was likely to be popular with pupils	√ (AB<C)			√ (AB<C)	
17.5 was inexpensive	√ (AB<C)			√ (AB<C)	
17.6 was backed by academic research	√ (AB<C)			√ (AB<C)	
17.7 was a good fit with existing practices	√ (AB<C)			√ (AB<C)	
17.8 aligned with our professional experience	√ (AB<C)			√ (AB<C)	
18. How effective do you think your approach has been so far in supporting pupil progress?	√ (AB<C)			√ (AB<C)	
19. To what extent do you consult the following sources when deciding on your approaches to support pupils' progress?					
19.1 Pupil performance data	√ (AB<C)			√ (A<B, B<C, A<C)	
19.2 External organisations (e.g. local authority or MoE)	√ (AB<C)			√ (AB<C)	
19.3 Articles, reports, books or summaries based on academic research	√ (AB<C)			√ (AB<C)	
19.4 Articles, reports, books or summaries based on teacher experience	√ (AB<C)			√ (AB<C)	
19.5 Information gathered through training/CPD	√ (AB<C)			√ (AB<C)	
19.6 Online evidence platforms or databases	√ (AB<C)			√ (AB<C)	
19.7 Guidance from exam boards					
19.8 Colleagues within my own school	√ (AB<C)			√ (AB<C)	
19.9 Colleagues in other schools	√ (AB<C)			√ (AB<C)	
20. How easy do you find it to understand the information that these sources provide about how to support pupils' progress?					
20.1 Pupil performance data	√ (A<B, B<C, A<C)			√ (A<B, B<C, A<C)	√ (Less than 4 years >20 years or more)
20.2 External organisations (e.g. local authority or MoE)	√ (AB<C)			√ (AB<C)	

20.3 Articles, reports, books or summaries based on academic research	√ (A<B, B<C, A<C)			√ (AB<C)	
20.4 Articles, reports, books or summaries based on teacher experience	√ (AB<C)			√ (AB<C)	
20.5 Information gathered through training/CPD	√ (AB<C)			√ (AB<C)	
20.6 Online evidence platforms or databases	√ (AB<C)			√ (AB<C)	
20.7 Guidance from exam boards	√ (AB<C)			√ (AB<C)	
20.8 Colleagues within my own school	√ (AB<C)			√ (AB<C)	
20.9 Colleagues in other schools	√ (AB<C)			√ (AB<C)	
21. What does the term 'evidence-based teaching' mean to you? Please select up to three boxes that best describe your understanding of the term.					
21.1 Conducting action research and applying the learning	√ (C<A, A<B, C<B)			√ (C<A, A<B, C<B)	
21.2 Learning from colleagues and applying the learning	√ (C<B, B<A, C<A)			√ (C<B, B<A, C<A)	
21.3 Applying MoE guidance	√ (C<AB)			√ (C<AB)	
21.4 Using an online evidence platform/database and applying the learning	√ (AB<C)			√ (AB<C)	
21.5 Applying exam board guidance	√ (A>BC)			√ (A>BC)	
21.6 Combining academic research evidence with my professional expertise	√ (AB<C)			√ (AB<C)	
21.7 Using pupil performance data to track pupil progress and plan ahead	√ (AB<C)			√ (AB<C)	
21.8 Applying the recommendations of an external supplier				√ (A>C)	
21.9 Reading and applying information from academic research or from working with researchers	√ (A>C)			√ (A>C)	
21.10 Learning from external consultants, trainers or advisors					
21.11 I don't know					
22. Please indicate the extent to which you agree with the following statements					
22.1 Information from research plays an important role in informing my/our teaching practice	√ (AB<C)			√ (AB<C)	
22.2 I do *not* believe that using information from research will help to improve pupil outcomes	√ (AB>C)			√ (AB>C)	
22.3 I know where to find relevant research that may help to inform teaching methods/practice	√ (AB<C)			√ (AB<C)	
22.4 My school leaders do *not* encourage me to use information from research to improve my practice	√ (AB>C)			√ (AB>C)	
22.5 I am able to relate information from research to my context	√ (AB<C)			√ (AB<C)	
22.6 Other staff in my school *rarely* use information from research to inform their teaching practice	√ (AB>C)			√ (AB>C)	
22.7 I feel confident about analysing information from research	√ (AB<C)			√ (AB<C)	
22.8 Information from research conducted elsewhere is of *limited* value to our school	√ (AB>C)	√ (Less than 4 years, 5-19 years <20 years or more)		√ (AB>C)	√ (Less than 4 years, 5-19 years <20 years or more)
22.9 I use information from research to help me to decide how to implement new approaches in the classroom	√ (AB<C)			√ (AB<C)	
23. In the last year, how (if at all) have you used information from academic research to inform your practice? (Please tick all that apply)					
23.1 I have not used information from academic research in the last year	√ (AB>C)			√ (AB>C)	√ (5-19 years < 20 years or more)
23.2 discuss best practice with colleagues	√ (AB<C)			√ (AB<C)	

23.3 Reflect on my own practice	√ (AB<C)			√ (AB<C)	
23.4 change classroom practice (this could be starting, developing or discontinuing an approach)	√ (AB<C)			√ (AB<C)	
23.5 contribute to my own research/enquiry	√ (AB<C)			√ (AB<C)	
23.6 influence colleagues to change their classroom practice (this could be starting, developing or discontinuing an approach)	√ (AB<C)			√ (AB<C)	
23.7 improve my knowledge of a topic or subject	√ (AB>C)			√ (AB>C)	
24. What was it about the research information that enabled you to change classroom practice? (Please tick all that apply)					
24.1 It was clear (e.g. language, style, presentation)	√ (AB<C)			√ (AB<C)	
24.2 It was convincing	√ (AB<C)			√ (AB<C)	
24.3 I was able to discuss the research with a researcher or someone else who understood it	√ (AB>C)			√ (AB>C)	
24.4 I could see clearly how the research related to our context	√ (AB<C)		√	√ (AB<C)	
24.5 There was coaching and training available based on the research	√ (AB<C)			√ (AB<C)	
24.6 It contained practical guidance about how to apply the research in the classroom	√ (AB<C)			√ (AB<C)	
24.7 I was able to see the research being applied in another school	√ (A>BC)			√ (AB>C)	
24.8 It encouraged collaborative enquiry	√ (AB<C)			√ (AB<C)	
24.9 It was supported by resources (e.g. funding, materials)	√ (A>BC)			√ (A>B, B>C, A>C)	
24.10 Other (please say what)					
25. Which of the following best describe why you have not changed classroom practice based on research information?					
25.1 The research supports our existing approach				√ (A<C)	
25.2 We are still planning changes to practice (either starting, developing or discontinuing an approach)				√ (B<C)	
25.3 The information was unclear (e.g. language, style, presentation)	√ (A>B)			√ (A>B)	
25.4 The information was not convincing				√ (A>B)	
25.5 It didn't contain practical guidance about how to apply the research in the classroom					
25.6 There was no information about how the research had been applied in other schools					
25.7 I was unable to discuss the research with a researcher or someone else who understood it					
25.8 I was unable to see clearly how the research related to our context					
25.9 There was no coaching or training available based on the research					
25.10 We had insufficient resources (e.g. time, staff, budget) to make changes					
25.11 It was difficult to convince school senior leaders				√	√ (5-19 years < 20 years or more)
25.12 It was difficult to convince other staff					
25.13 Other (Please say what)					

Note: √ means that there is a statistically significant difference.
A<C means that the mean of School C is higher than that of School A.
AB<C means that the mean of School C is higher than the means of both School A and School B, but there is no statistically significant difference between School A and School B.
The same symbols apply to the results by teacher experience.
Blank cell means that there is no statistically significant difference.

Appendix 9. Two-way ANOVA Results (Scales by School & Teacher Experience)

Two-way ANOVA Results (Scales by School & Teacher Experience)

All survey scales (only including items used for scales)	Two-way ANOVA			One-way AVOVA	
	School (A, B & C), p<0.05	Experience (Less than 4 years, 5-19 years & 20 years or more), p<0.05	Interaction, p<0.05	School (A, B & C), p<0.05	Experience (Less than 4 years, 5-19 years & 20 years or more), p<0.05
Collaborative Enquiry					
Scale 1: Reflection (9. On average, how often do you do the following in this school?)					
9.1 How often do you evaluate your lessons?					
9.2 In your evaluations how often do you think about 'why' and 'so what' as well as what happened?					
9.3 How often do you modify your lessons as a result of reflection?				√ (A<C)	
9.4 How often do you talk to a colleague about learning and teaching?					
9.5 How often do you apply wise suggestions to improve your practice?					
9.7 How often do you listen and act upon the views of others (e.g. learners, teaching assistants) when reflecting on how to improve lessons?					
9.8 How often do your team/staff meetings include discussions about how to improve the quality of learning and teaching?	√ (AB>C)			√ (AB>C)	
Scale 2: Use of research and evidence (9. On average, how often do you do the following in this school?)					
9.9 How often do you read relevant research literature?					√ (Less than 4 years > 5-19 years)
9.10 How often do you compare different sources of evidence when deciding what actions to take?	√ (A<C)			√ (A<C)	
9.11 How often do you undertake action research as a result of reflecting upon learning and teaching?					
9.12 How often do you evaluate your professional development activities, such as attending courses?	√ (A<C)			√ (A<BC)	
9.13 How often do you incorporate ideas from professional development activities into your practice?	√ (A<C)			√ (A<C)	
9.6 How often do you 'look outside' the school for inspiration?					
Scale 3: Collaboration (13. Collaborative activity)					
13.1 Exchange teaching materials with colleagues					
13.2 Engage in discussions about the learning development of specific students	√ (A<BC)			√ (A<BC)	
13.3 Work with other teachers in my school to ensure common standards in evaluations					
13.4 Attend team conferences					
PLCs					
Scale 1 (10. Deprivatised practice, please tick all that apply)					

10.1 Feedback following direct observation of your classroom teaching	√ (AB<C)			√ (AB<C)	
10.2 Feedback from student surveys about your teaching	√ (AB<C)			√ (AB<C)	
10.3 Feedback following an assessment of your content knowledge	√ (B<A, A<C, B<C)			√ (B<A, A<C, B<C)	
10.4 Feedback following an analysis of your students' test scores	√ (AB<C)	√ (Less than 4 years < 5-19 years, 20 years or more)		√ (AB<C)	√ (Less than 4 years < 5-19 years, 20 years or more)
10.5 Feedback following your self-assessment of your work	√ (AB<C)			√ (AB<C)	
10.6 Feedback following surveys or discussions with parents or guardians	√ (AB<C)		√	√ (AB<C)	
Scale 2 (11. Collective focus on student learning)	**√ (AB<C)**				
11.1 Student performance	√ (B<C)			√ (B<C)	
11.2 Knowledge and understanding of my subject fields	√ (AB<C)			√ (AB<C)	
11.3 Pedagogical competencies in teaching my subject fields	√ (AB<C)			√ (AB<C)	
11.4 Student assessment practices	√ (AB<C)			√ (AB<C)	
11.5 Student behaviour and classroom management	√ (B<C)			√ (B<C)	
Scale 3 (12. Reflective dialogue)	**√ (AB<C)**				
12.1 Your classroom management practices	√ (AB<C)			√ (AB<C)	
12.2 Your knowledge and understanding of your main subject fields	√ (A<C)			√ (B<C)	
12.3 Your teaching practices	√ (AB<C)			√ (A<C)	
12.4 Your methods for teaching students with special needs	√ (AB<C)	√ (Less than 4 years <20 years or more)		√ (AB<C)	√ (Less than 4 years <20 years or more)
12.5 Your use of student assessment to improve student learning					
Scale 4 (13. Collaborative activity)					
13.1 Exchange teaching materials with colleagues					
13.2 Engage in discussions about the learning development of specific students	√ (A<BC)			√ (A<BC)	
13.3 Work with other teachers in my school to ensure common standards in evaluations					
13.4 Attend team conferences					
Scale 5 (14. Shared sense of purpose)	**√ (AB<C)**				
14.1 This school has a culture of shared responsibility for school issues	√ (B<C)			√ (B<C)	
14.2 There is a collaborative school culture which is characterised by mutual support	√ (AB<C)		√	√ (AB<C)	
Research Engagement					
Scale 1 (Positive disposition to academic research in informing teaching practice)	**√ (AB<C)**				
20.3 How easy they find it to understand academic research (item 3)	√ (A<B, B<C, A<C)			√ (AB<C)	
22.1 Information from research plays an important role in informing my/our teaching practice (item 1)	√ (AB<C)			√ (AB<C)	
22.3 I know where to find relevant research that may help to inform teaching methods/practice (item 3)	√ (AB<C)			√ (AB<C)	
22.5 I am able to relate information from research to my context (item 5)	√ (AB<C)			√ (AB<C)	
22.7 I feel confident about analysing information from research (item 7)	√ (AB<C)			√ (AB<C)	

22.9 I use information from research to help me to decide how to implement new approaches in the classroom (item 9)	√ (AB<C)			√ (AB<C)	
Scale 2 (Use of academic research to inform selection of teaching approaches)	**√ (AB<C)**				
16.4 Academic research was important in identifying a specific approach and they used CPD based on academic research (item 4)	√ (AB<C)			√ (AB<C)	
17.6 The extent to which the decision to adopt an approach was due to it being based on academic research (item 6)	√ (AB<C)			√ (AB<C)	
19.3 The extent to which they consult academic research (generally) (item 3)	√ (AB<C)			√ (AB<C)	
Scale 3 (Perception that academic research is not useful to teaching)	**√ (AB>C)**	**√ (Less than 4 years, 5-19 years<20 years or more)**			
22.2 I do not believe that using information from research will help to improve pupil outcomes (item 2)	√ (AB>C)			√ (AB>C)	
22.8 Information from research conducted elsewhere is of limited value to our school (item 8)	√ (AB>C)	√ (Less than 4 years, 5-19 years <20 years or more)		√ (AB>C)	√ (Less than 4 years, 5-19 years <20 years or more)
Scale 4 (Perception that own school does not encourage use of academic research)	**√ (AB>C)**				
22.4 My school leaders/governors do not encourage me to use information from research to improve my practice (item 4)	√ (AB>C)			√ (AB>C)	√ (AB>C)
22.6 Other staff in my school rarely use information from research to inform their teaching practice (item 6)	√ (AB>C)			√ (AB>C)	
Scale 5 (Active engagement with online evidence platforms)	**√ (AB<C)**				
19.6 The extent to which they consult online platforms (generally) (item 6)	√ (AB<C)			√ (AB<C)	
20.6 How easy they find it to understand online platforms (item 6)	√ (AB<C)			√ (AB<C)	

Note: √ means that there is a statistically significant difference.
A<C means that the mean of School C is higher than that of School A.
AB<C means that the mean of School C is higher than the means of both School A and School B, but there is no statistically significant difference between School A and School B.
The same symbols apply to the results by teacher experience.
Blank cell means that there is no statistically significant difference.

Appendix 10. Results on the Scales of Research Engagement

Research Engagement						Total valid responses N (%)
Scale 1 (Positive disposition to academic research in informing teaching practice)						
20.3 How easy they find it to understand academic research	*I don't use this source* N (%)	*Not at all easy* N (%)	*Not very easy* N (%)	*Quite easy* N (%)	*Very easy*	342 (100)
	11 (3.2)	34 (9.9)	**133 (38.9)**	93 (27.2)	71 (20.8)	
	Strongly disagree N (%)	*Disagree* N (%)	*Agree* N (%)	*Strongly agree* N (%)		
22.1 Information from research plays an important role in informing my/our teaching practice	30 (8.7)	28 (8.1)	**191 (55.4)**	96 (27.8)		345 (100)
22.3 I know where to find relevant research that may help to inform teaching methods/practice	28 (8.2)	50 (14.6)	**167 (48.7)**	98 (28.6)		343 (100)
22.5 I am able to relate information from research to my context	26 (7.6)	45 (13.1)	**176 (51.3)**	96 (28.0)		343 (100)
22.7 I feel confident about analysing information from research	28 (8.2)	69 (20.3)	**149 (43.8)**	94 (27.6)		340 (100)
22.9 I use information from research to help me to decide how to implement new approaches in the classroom	30 (8.7)	52 (15.1)	**161 (46.7)**	102 (29.6)		345 (100)
Scale 2 (Use of academic research to inform selection of teaching approaches)						
16.4 Academic research was important in identifying a specific approach and they used CPD based on academic research	*N*	*%*				Total N=355; Missing N=35
	177	55.3				
17.6 The extent to which the decision to adopt an approach was due to it being based on academic research	*Not applicable* N (%)	*No influence* N (%)	*Some influence* N (%)	*Strong influence* N (%)		336 (100)
	11 (3.3)	42 (12.5)	**190 (56.5)**	93 (27.7)		
19.3 The extent to which they consult academic research (generally)	*Not at all* N (%)	*A little* N (%)	*A lot* N (%)			346 (100)
	36 (10.4)	**167 (48.3**)	143 (41.3)			
Scale 3 (Perception that academic research is not useful to teaching)						
	Strongly disagree N (%)	*Disagree* N (%)	*Agree* N (%)	*Strongly agree* N (%)		
22.2 I do not believe that using information from research will help to improve pupil outcomes	95 (27.7)	**125 (36.4)**	95 (27.7)	28 (8.2)		343 (100)
22.8 Information from research conducted elsewhere is of limited value to our school	101 (29.8)	**107 (31.6)**	104 (30.7)	27 (8.0)		339 (100)
Scale 4 (Perception that own school does not encourage use of academic research)						
	Strongly disagree N (%)	*Disagree* N (%)	*Agree* N (%)	*Strongly agree* N (%)		
22.4 My school leaders/governors do not encourage me to use information from research to improve my practice	106 (31.0)	**128 (37.4)**	87 (25.4)	21 (6.1)		342 (100)

22.6 Other staff in my school rarely use information from research to inform their teaching practice	95 (27.6)	**116 (33.7)**	106 (30.8)	27 (7.8)		344 (100)
Scale 5 (Active engagement with online evidence platforms)						
19.6 The extent to which they consult online platforms (generally)	*Not at all* N (%)	*A little* N (%)	*A lot* N (%)			284 (100)
	36 (12.7)	**141 (49.6)**	107 (37.7)			
20.6 How easy they find it to understand online platforms	*I don't use this source* N (%)	*Not at all easy* N (%)	*Not very easy* N (%)	*Quite easy* N (%)	*Very easy* N (%)	334 (100)
	18 (5.4)	35 (10.5)	90 (26.9)	**111 (33.2)**	80 (24.0)	

Note: The highest percentage is highlighted in bold

Appendix 11. Interview Schedule

访谈提纲
Interview schedule

尊敬的老师
Dear Teacher,

此访谈用于探索您在职业生涯中关于教师专业发展和合作性探究的看法。您提供的信息将会被纳入关于合作性探究对于促进中国西南农村地区教师专业发展和反思性实践的博士研究课题。访谈将持续 1 小时，并会在您同意的情况下被录音。所有收集的信息都会被私密保存。
This interview is designed to explore your views on teacher professional development and collaborative enquiry practices in your professional lives. The information you provide will feed into a PhD study that explores the role of collaborative enquiry in promoting teacher professional development and reflective practices in rural Southwest China. The interview will last for about one hour and it will be recorded with your permission. All the information collected here will be treated confidentially.

谢谢您的参与！
Thank you very much for your participation!

第一部分 教师专业发展
Part 1 Teacher professional development

1.1 能否请您告诉我在过去一学年里参加了一些什么样的教师专业发展活动？能否给我一个或多个例子？（这些活动是正式的还是非正式的？校内组织的还是校外组织的？）
1.1 Could you please tell me the types of professional development activities in which you participated at your school in the last academic year? Could you please give me a specific example/s? (Are these activities formal or informal? Are they internal or external to your school?)

1.2 这些活动的重点是什么？（持续的时间有多长？是单独参加还是集体参加？您觉得您或其他老师愿意积极参加这些活动吗？为什么？这些学习与您的教学理念是相符的吗？）
1.2 What was the focus of these activities? (How long did the activities last? Did you participate in the activities independently or collectively? Do you feel that you or other teachers or both were actively committed to the activities? Why? Do you feel the learning has been consistent with your beliefs about teaching and learning?)

1.3 这些活动对于您作为教师来讲有影响吗？能举一些例子吗？（您觉得这些活动对您的教学实践来说实用吗？尤其是对于提升您的专业知识、技能和态度比如思考 / 改进教师实践或工作满意度？什么活动的影响最大？为什么？）
1.3 What is the impact of these activities on your development as a teacher? Could you please give me some examples? (Do you think those activities are practical and useful in your teaching practices, particularly in terms of developing your professional knowledge and skills or attitudes, e.g. to improving/thinking about your practices, job satisfaction? What activities had the highest impact and why?)

那么关于学历课程和个人 / 集体研究呢？
(if not mentioned already could add prompts on…) How about qualification programme and individual or collaborative research?

第二部分 合作、证据使用和反思
Part 2 Collaboration, use of evidence and reflection

2.1 请问您在学校是如何和其他老师进行合作的？能否举一些例子？（比如参加集体会议、和同事交换教学材料、和老师讨论某些具体学生的学习进展情况？ 。是同年级还是跨年级？通过什么方式 - 正式 / 非正式？什么样的合作是最频繁 / 最不频繁的？为什么？）
2.1 How do you or other teachers or both in your school work collaboratively with each other? Could you please give me some examples? (e.g. attend team conferences, exchange teaching materials with colleagues; engage in discussions about the learning development of specific students. The same or different year groups? In what form - formal/informal)? Which types of collaboration are the most/least frequent? Why?)

您或其他老师在学校愿意和其他老师合作吗？为什么？（您觉得合作对您的教学实践有帮助吗？您是怎么应对竞争的？为什么？）

Are you or other teachers willing to work with other teachers in your school? Why? (Do you find collaboration useful for your teaching practices? How do you deal with competitions? Why?)

您和其他老师一起评估学生进步确保共同的标准？有多频繁？为什么？
(if not mentioned already add probe question such as "do you work with other teachers in your school to ensure common standards in evaluations for assessing student progress"? How often? Why?)

2.2 在多大程度上您或其他老师定期或系统分析学生学了什么或者如何学？如何使用证据呢？研究证据和非研究的证据？ 参与了什么科研课题？
2.2. To what extent do you or other teachers or both regularly and consistently analyse what and how students are learning? How do you use evidence? Both research evidence and non-research evidence? Have you undertaken any research projects?

在哪种程度上使用专家资源，比如课程顾问、教学名师、研究顾问等等？
To what extent have you utilised expert others such as curriculum consultants, instructional coaches, instructional coordinators, principals as instructional leaders, researcher consultants and other professionals?

您能使用的提高教学实践的研究证据的质量如何？一般来说，这样的证据是强还是弱呢？（是依据观点还是实证而来？是使用的国外的证据？如何能更好地帮助您使用研究证据以提到您的教学实践？）
How is the quality of research evidence available for you to use to enhance your practices? Is the evidence typically available strong or weak? (Is it based on opinion or empirical research? Is evidence used from outside China? What would assist you in better use of research evidence to improve your practices?)

2.3 您觉得您自己平时有反思吗？具体在哪一方面反思呢？能举例子解释吗？（比如学生成绩、对于学科的知识和理解、教学方法？您是怎么反思的呢？通过什么方式反思呢？备课本，听课本，作业？个人反思还是集体反思？哪种反思是最频繁／最不频繁？为什么？）
2.3 Do you think you or other teachers are reflective? On what aspect? Could you please give me some examples? (For example, student performance, knowledge and understanding of your subject fields, pedagogical competences in teaching your subject fields…How do you reflect on your practices? In what form (formal/informal)? Individually or collectively? Which types of reflection are the most/least frequent? Why?)

在教授有特殊需求的学生方面会反思吗？
(if not mentioned already ask probe questions for clarification) (How about reflective in methods for teaching students with special needs?)

您觉得自己有批判性地反思吗？为什么？需要什么帮助以更好地对教学进行批判性反思呢？
Do you think that you are critically reflective enough? Why? What support do you need for your critical reflection on teaching and learning?

第三部分合作反思探究
Part 3 Collaborative reflective enquiry

3.1 您觉得探究这个词指的是什么呢？能举例子进行说明吗？合作反思探究呢？
3.1 What does the term "enquiry" mean to you? Can you provide an example to illustrate this? How about collaborative reflective enquiry?

3.2 能举出一些合作反思探究的例子吗？一般您是怎么做的呢？从您的观点来讲是什么样的过程呢？
3.2 Could you please give me some examples of collaborative reflective enquiry practices in your school? How do you usually do that? What are the processes in your view?

3.3 就有效的探究实践而言，对于老师和学生的帮助是什么呢？
3.3 In terms of effective enquiry practices in your school, what are the benefits for teachers and students?

3.4 有一些什么样的挑战呢？能否举一些例子？
3.4 What are the main challenges? Could you please give me some examples?

3.5 有什么策略可以更好地促进教师的合作反思探究实践呢？需要学校、管理层、当地教育系统提供什么样的条件／支持以提高您的合作反思探究实践从而提高您的专业发展与学习呢？
3.5 What are the strategies that could enhance teachers' collaborative reflective enquiry practices in your school? What conditions/support do you need from the school, leadership teams and LEAs to enhance your collaborative reflective enquiry practices for development and learning?

在多大程度上，学生学习引导着您在专业发展和学习方面进行探究？学生学习的重点是什么呢？在多大程度上，您同意教师探究是一个分享的过程？您觉得探究对于提高您的教学知识和技能有帮助吗？在多大程度上，您同意您是通过反思采取行动的？在多大程度上您同意您对于教学的理解随着探究的过程在加深？有通过数据分析深入探究学习吗？在多大程度上根据课堂不断地调整知识和教学方法？

(if not mentioned already add probe question) To what extent does student learning guide your enquiry in your professional development and learning? What is the key focus of student learning? To what extent do you agree that teacher enquiry is a shared process? Do you think that is helpful in improving your knowledge and skills? To what extent do you agree that your actions are informed by reflection? To what extent do you agree that your understanding of teaching and learning has grown from cycles of enquiry? Is analysis used to drive deep into learning? To what extent have you or other colleagues continually adapt and apply knowledge and pedagogical approaches in response to your work in the classroom?

Appendix 12. Examples of Qualitative Themes and Quotes

Interview coding framework

Themes	Codes	Sub-codes	Quotes	RQs
Concept of collaborative reflective enquiry	To explore and research collaboratively	To explore and research; Conducting research on teaching and learning; Collective Lesson Plan as a form of collaborative reflective enquiry; A deep meaning	"…In my impression, enquiry literally means to *tansuo* (explore) and *yanjiu* (research) something…basically to explore something deeper based on what has been understood…" (SchBToMaths) "…I think enquiry means to *tansuo* (explore) and *yanjiu* (research) something. *It is about conducting research on teaching and learning, a way of innovation.* The Collective Lesson Plan in my school can be a form of teacher collaborative reflective enquiry but is only about basic research on classroom management and the delivery of the curriculum etc…However, I think the word enquiry carries a meaning that is even deeper. What we do as teachers on a daily basis is just about discussions, but enquiry means to explore something deeper…" (SchBToEnglish)	2
Focus on teaching and curriculum	Focus on teaching; Focus on curriculum	Pre-allocated tasks based on syllabus; The planning and structuring of the syllabus; Feedback on the teaching plan; Lesson planning for the curriculum content; Discussions with one another	"We follow such a procedure to do Collective Lesson Plan. Before the new term starts, all teachers will be allocated with different tasks. The tasks are allocated differently according to the syllabus that teachers need to prepare for the lesson. Then two teachers will plan lessons independently. Once attending the Collective Lesson Plan meetings, these two teachers will need to present the planning and structuring of that session, with pre-prepared PPTs. Then all other teachers will discuss about the issues on the PPTs...Teachers will provide both teachers with feedback and comments on the areas for improvement in the teaching plan…" (SchBToChinese) "…Typically, when we start the Teaching and Research Groups meetings, we will need to reach an agreement in the extent to which the curriculum content needs to be covered. Then we will see how we could deliver that, for example through four sessions or seven sessions? Then we will discuss what is more difficult and/or important for us to deliver…Afterwards, we will explore with one another to address that issue. This is how we do it…" (SchBToMaths)	2
Relevance to student learning	Focus on student learning needs; Focus on student reaction	To understand students; Planning based on students' needs; Teacher self-evaluation based on student reaction	"The process of Collective Lesson Plan is to understand our students. This means that we need to know at which level our students are, and the lessons need planning based on students' needs…usually we plan our lessons based on students' needs. We also plan the lessons based on textbooks and complementary materials such as tutoring books…" (SchBToMusic) "… Teachers need to evaluate themselves through students and adjust their teaching plans and behaviours based on student reaction. Student	2

			learning outcomes should be perceived as the standards for teachers…" (SchAToHistory)	
Formal and informal collaboration	Formal collaboration; Informal collaboration	Collaboration is a must; Different collaborative activities; Discussion with colleagues in the office; Chat to each other on the way home;	"In our school, collaboration with other teachers is a must. We need to collaborate with other teachers through participating in Teaching and Research Groups activities, discussing about textbooks or curriculum standards and exchanging slides/lesson planning materials etc.…We learn from each other through the above ways…" (SchCToMaths) "…For example, if we meet the teachers of the same subject with me in the office, sometimes two or three teachers, we will discuss difficult issues arising from classroom teaching or student homework and seek to find out a better approach to addressing these issues…Occasionally when we are off work, we will chat to each other on our way home…" (SchAToChemistry)	2
Collaborative and individual reflection	Collaborative reflection; Individual reflection	To reflective collaboratively; Group discussions and reflection on teaching experiences and pedagogy; Individual reflection on lesson delivery	"…We reflect collaboratively…All History teachers across three Year Groups get together to discuss…particularly after exams, we analyse exam results together, then we reflect on our teaching, especially on areas that need to be improved…We learn from each other's experience and adopt pedagogical approaches that are innovative and suitable for the Curriculum Reform…" (SchAToHistory) "…usually in our school one teacher teaches two classes. When you finish one session, you will need to reflect on what hasn't been delivered clearly. You will need to understand what the problem is. Then you adjust within a few minutes and try to deliver in the second class… Also, we reflect together after exams. If the same problem remains in both classes I teach, this means that there must be something that hasn't been delivered. Then I will need to clarify further…" (SchBToMaths)	2
Use of evidence and academic research	Evidence based on exam results; Evidence based on student homework; Evidence based on academic research	Regular meetings on the scope of knowledge for exams; Analysis after exams; Teachers' reflection on student performance; Student homework; Engagement in academic research projects	"…For instance, we have got two to three exams every month. Each one of the Year Groups will take the lead to organise (meetings) on a monthly basis. We have three Year Groups in total. Before the exams, the Year Groups will host Teaching and Research Groups meetings to decide on the scope of the knowledge points for exams...after the exams, meetings will be held to analyse exam results regarding teaching quality…Based on the exam result analysis of all Year Groups, both the strengths and weaknesses of pedagogical approaches will be analysed. If students don't perform well in exams, teachers will need to reflect on their own practice for improvement…" (SchCToChinese) "…We usually analyse student learning by looking at student homework…We think about the kinds of homework students in set A need, and those for students in set B? We come up with a homework plan…" (SchBToICT) "…For example, we have just finished a small research project regarding how to get students engaged in the first five minutes of a formal	2

			Chinese lesson through music and poetry…Throughout the participation process, we thought about different ways of stimulating students' interests…" (SchBToChinese)	
Iterative process of enquiry	Regular enquiry with colleagues; Lesson planning and mutual learning	Activities scheduled on every Monday Afternoon/Tuesday Morning; Weekly meetings on each Monday; Lesson planning and discussions with one another; Mutual learning	"…The Collective Lesson Plan activities for teachers of Chinese and English are scheduled on every Monday Afternoon. The activities for other teachers are on every Tuesday Morning. The primary focus of the Plan is on lessons to be taught in that week. We also review what has been taught and discuss with one another…" (SchAToEnglish) "…With regards to team meetings, on each Monday we have a weekly meeting where all teachers of the same subjects gather. We collect all materials relevant to our teaching…We learn from experienced teachers…" (SchBToMusic)	2
Leadership support	The promotion of Collective Lesson Plan from the Senior Management Team; Analysis of students' exam results led by the school administrative department	Support from the Senior Management Team for Collective Lesson Plan; Curriculum content, teaching tasks and content; Presentations and feedback; Analysis on students' exam results led by the school administrative department	"…The Senior Management Team in the school has been promoting Collective Lesson Plan. Each week two hours (around two sessions) will be allocated to Collective Lesson Plan focused on the following two aspects…Issues related to the curriculum content in the forthcoming week will be addressed in terms of key teaching tasks and difficult content as well as the skills for the delivery. For each one of the planning meetings, one teacher will take the lead and present what has been prepared for the teaching sessions, and other teachers will provide their feedback accordingly, comment on the strengths of the planning and discuss the weaknesses...In doing so, teachers are enquiring collaboratively (about their teaching) …" (SchBToICT) "…Usually there are more group activities in the subjects of Chinese and English…but our school has a strong focus on teaching quality…Therefore, after each exam, the Office of Teaching Affairs will first analyse students' exam results of all classes respectively and then hand out these results to all Class Supervisors and subject teachers. Then the Class Supervisors and subject teachers will discuss with each other and analyse the results together, focusing especially on low-achievers…" (SchAToCheministry)	2
Perceived benefits	Improve teachers' teaching; Mutual learning	Beneficial for teachers' teaching and teaching skills; Mutual learning; Better delivery of the curriculum	"If teachers are in the same Teaching and Research Groups, the Collective Lesson Plan for them is a form of collaborative reflective enquiry for teachers… as I mentioned earlier, teachers plan the lesson together, share their own ideas about that lesson and reach a mutual agreement in Teaching and Research Groups meetings. This is something that can really benefit teachers' teaching and help improve teachers' professional skills…" (SchCToChinese) "If we talk about the benefits from teachers' point of view, collaborative reflective enquiry requires teachers to dig deep about textbooks in order to prepare good questions for their teaching. In doing so, teachers may deliver the curriculum better. This is definitely beneficial for teachers..." (SchBToICT)	2

A lack of genuine collegiality	Superficial sharing; Less genuine collaboration	Superficial planning and sharing; Some teachers' reluctance to collaboration; Less engagement	"...sometimes when planning lessons, teachers are superficial, without getting prepared for lesson design or conducting research on textbooks or exam guidelines...They may just download slides online and make simple changes...Also some of them may not be happy to share what they have prepared..." (SchBToChinese) "Usually most of the teachers (in our school) are willing to collaborate with one another, but some teachers may still be reluctant to this…younger teachers are engaged in lesson planning but since older teachers have had experience already, some of them may be a bit (less engaged) …" (SchAToEnglish)	2
Superficial reflection	Superficial reflection on their teaching; Lack of depth in reflection	Superficial reflection; Lack of depth on their reflection on teaching practices;	"…It (reflection) needs to be strengthened. This is because most of the teachers reflect on their practice superficially. Few of them think deeply about their teaching. If teachers can reflect on their practice in depth, they are usually excellent teachers. However, only few of them are that good, aren't they…" (SchAToEnglish) "…Overall, I think some teachers only reflect based on personal experience. Their reflection may lack depth from my personal point of view. I am not sure whether teachers can reflect very deeply on their practice…" (SchAToHistory)	2
Less active engagement in academic research	A need for theoretical guidance; Less active engagement in academic research	A need for theory of change; A lack of theoretical guidance; Less active engagement in academic research due to workload and personal interests	"…I think we still need theory of change. After all, teaching is a specific form of practice (teaching practices), but there is relatively a lack of theoretical guidance. Theory of change can assist us in assessing our 'hunch' in teaching in order to help us gain a better understanding of our behaviours and thoughts. The theory of change can facilitate more alternatives for our practice and strengthen our theoretical foundations which can in turn enable us to articulate our personal behaviours...Hence, teachers can assess our own thoughts and behaviours from a broader perspective...However, I have to say the theoretical guidance lacks in our daily practice…" (SchAToHistory) "…I have been asked to undertake some research projects, but I haven't done any…this is because I have been working as a Class Supervisor, managing all my students, and usually I have got teaching commitments of two classes. Also, I have to attend training courses organised by authorities at County and City levels…and most importantly, I am personally not that interested in academic research…" (SchAToEnglish)	2
Preference for conventional teaching practices	Preference for a more traditional teaching approach; Difficulty of teachers in changes	A dominant cramming approach; Traditional teaching approach; Difficulty of teachers in changing approaches	"…In places such as Western China, teachers are used to cramming. Teachers teach in the front of the classroom, and students just listen…Teachers are still used to a more traditional teaching approach…" (SchAToEnglish) "…In practice, it really depends on teachers, as some teachers have been using the same approaches for decades. It may be a bit difficult for them to update and innovate. Therefore, the	2

			effectiveness of such participation is not obvious…" (SchCToEnglish)	
The quality of collaborative reflective enquiry	Teachers' less seriousness about enquiry; The quality of teachers' collaborative reflective enquiry	Teachers' less seriousness about Teaching and Research Groups; The quality of teachers' research into teaching	"…Some teachers are not serious about the activities of Teaching and Research Groups. They are not that willing to participate in such activities…This is probably why the quality of teachers' research into teaching is not obvious…" (SchBToEnglish)	2
External training and funding	External training opportunities; Funding	To go out for training; External training; Strong focus on management skills of class supervisors; Funding	"…We need to encourage our teachers to go out for training. Statistically, half of our teachers have been teaching for decades in the School but have never listened to the lessons of other teachers outside of the school…" (SchBToEnglish) "If teachers need to go out for training, funding is an issue…In our school the funding is limited, and few teachers can go to other schools for training. Subsequently, the School only considers sending one or two teachers. Why not more teachers? This is probably because the training expenses are high and yet free training opportunities provided by the Local Education Authorities are limited. This is the reason why we need to pay for the opportunities provided by external organisations, depending upon the total number of teachers for training. For example, it may cost hundreds of Chinese Yuan per person. Apart from that, we need to pay for accommodation, transport etc…" (SchBToEnglish)	3
Genuine teacher collaboration and school-to-school collaboration	Genuine teacher collaboration; School-to-school collaboration	A need for genuine teacher collaboration; To advance their teaching philosophy and pedagogical approaches; School-to-school collaboration; Mutual communication and learning	"…There is a need to enhance genuine teacher collaboration…I think teachers should have the awareness of working with colleagues, and teachers need to advance their teaching philosophy and change their pedagogical approaches…This is because traditionally teachers have only worked on their own and haven't really learned from each other…Also, teachers should listen to more model lessons and enhance their understanding of theories…" (SchCToMaths) "…We could work collaboratively with other schools around us (e.g. sister schools) to do observations or lesson plan. Our teachers could go to School A for lesson planning, and teachers in School B can come to our school to do public lectures. This could be a very good way of communication between the two schools. Comparatively, the academic abilities of students in the schools around us are not that different, and the schools have been performing academically almost at the same level. Therefore, the pedagogical approaches are relatively similar. In this case the mutual learning across schools could be more effective…In addition, I think teachers who teach the same cohort of students need to come together, listen to public lessons and give feedback to each other…Although our school has a strong focus on teaching and research, there is still a lack of sufficient monitoring mechanisms throughout the process…" (SchBToChinese)	3

Incentives	Teachers' job title and/or career progression	Linking it to teachers' job title and/or career progression; The impact of job title on teachers' engagement	"…As we mentioned earlier, it would be better to have evaluative mechanisms…Given the Chinese characteristics of the education system, teachers need to be evaluated. It should be linked to teachers' job title and/or career progression…" (SchAToEnglish) "Regarding the job title system in China, many teachers have been working for decades, but they haven't got promoted to a higher rank. Therefore, some teachers have become less engaged in professional development…There is competition between teachers. If teachers are considered for career progression, they will be compared with one another in their performance…" (SchAToHistory)	3
Teacher commitment and passion	Teacher commitment and passion	Teachers' commitment and passion towards education	"…The key is to enrich teachers' thoughts on education and enable teachers to see education as a cause, thereby developing their passion towards education. In doing so, teachers are less likely to be distracted by things like low pay or teaching environment. Most of the time, it is more about teachers' understanding towards this profession…Simply speaking, teachers have to be very passionate about education…" (SchAToEnglish)	3