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College of Social
Sciences

Lesson Study as Teacher Development Strategy:

A Case Study of Primary Schools in Riyadh, Saudi Arabia

by

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A thesis submitted in fulfilment of the requirements for the degree of

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Abstract

This mixed-methods case study investigated the perspectives of teachers (T) and school leaders (SL) regarding the impact of Lesson Study (LS) as a school-based strategy for teacher professional development in KSA. Specifically, the study explored how the model helps in enhancing the content knowledge (CK), pedagogical content knowledge (PCK) and building a collaborative learning community based on the views of teachers and school leaders. Overall, a total of 54 participants including 50 teachers (25 males and 25 females) and 4 school leaders took part in this research study. More specifically, 50 teachers answered the questionnaires and 12 out of them were interviewed in addition to 4 school leaders (2 males and 2 females). The five key research questions which guided the study focused on examining primary school teachers and school leaders' perceptions of the impact of LS on developing content knowledge and pedagogical content knowledge of Maths, Science and Arabic. In addition, the perceived influence of LS on school-based collaborative learning communities, the perceived benefits of implementing LS and perceived challenges to implementation in primary school context were closely investigated.

Literature pertaining to teacher professional development (PD) and LS was reviewed. Data from questionnaires for teachers and interviews with both teachers and school leaders were examined both quantitatively and qualitatively to define common categories, themes, and connections to each of the research questions. The findings indicated that teachers and their school leaders believed that the participation of teachers in LS model can enhance teachers' CK, PCK, and can build a collaborative learning community which leads to breaking the culture of isolation in the school. This study examined the benefits and challenges while participating in LS. The findings suggested that the most frequently cited benefits were obtained by improving teacher performance as a result of participating in LS, improving student outcomes, ability to link daily teaching practices to long term objectives, and changes in motivation and a sense of effectiveness. The major challenges were the scheduling of meeting times, insufficient training of teachers ahead of implementing LS, insufficient understanding of LS by some teachers, the lack of sufficient support and resources that enable high-quality implementation of LS, teachers lacking CK when implementing LS, the lack of long-term vision for the implementation of LS, teachers' lack of PCK when implementing LS as well as the existence of negative attitudes about LS among some teachers. In summary, the findings in this study suggested that LS was an effective model of professional development for teachers as LS helped them become better and more informed teachers. Recommendations were suggested to address the identified challenges.

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Author's Declaration

“I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.”

Printed Name: Maged Saad O Almadi

Signature:

Publication arising from this work

Poster presentations

Almadi M.. Lesson study as a professional learning model in Saudi Arabia. The World Association of Lesson Studies (WALS) International Conference, September 2019, Amsterdam, Netherlands.

Abbreviations

BA	Bachelor
CA	Content Analysis
CK	Content Knowledge
GAfETS	The General Administration for Educational Training and Scholarships
JICA	Japan International Cooperation Agency
KSA	The Kingdom of Saudi Arabia
KSTM	Korean Society of Teachers of Mathematics
LS	Lesson Study
M	Master
MoE	Ministry of Education
NIPED	National Institute for Professional Educational Development
PCK	Pedagogical Content Knowledge
PD	Professional Development
PL	Professional Learning
PLC	Professional Learning Community
TIMSS	Third International Mathematics and Science Study
USA	The United States of America

Chapter 1 Introduction

1.1 Overview and Background

Considered the “cornerstone to educational development” (Özer and Beycioglu, 2010), professional development (hereafter, PD) is significant throughout the journey of a teaching career for very good reasons. For instance, for some time now, it has been strongly argued that PD provides a robust vehicle for the creation of extraordinary teachers who are capable of advancing the achievement of students through the provision of high-quality teaching (Goldsmith et al., 2014; Lawrence and Chong, 2010). Thus, PD does not cease when teachers receive their qualifications (Evans, 2008) but rather, it facilitates the continual deepening of knowledge and skills throughout the professional life (Garet et al., 2001). While it may seem obvious or intuitive that student achievement influences professional growth, the relationship between them is not always that straightforward (Yoon et al., 2007). Nonetheless, it has been proven over the years that successful PD does improve and enhance the skills, knowledge, and abilities of teachers through the provision of access to opportunities for education and training (Goldsmith et al., 2014; Lawrence and Chong, 2010). Benefits of PD include, firstly, giving teachers the opportunity to communicate and maximize professional interaction with their colleagues (Ostovar-Nameghi and Sheikahmadi, 2016). Secondly, it improves academic achievement by promoting collaboration and construction of knowledge (Ostovar-Nameghi and Sheikahmadi, 2016).

As a result, the calls for improvements in professional development over the years have been relentless and enduring. Putting forwards many proposals for some time now has strengthened these efforts (Alamri, 2020). There have also been proposed approaches and models of professional development, which vary in their nature and philosophy. Some traditional professional development methods include attendance of short courses usually intended to introduce specific ideas, strategies or materials with little or no follow-up to ensure implementing them in the classroom (Alamri, 2020). Although widespread, short courses or workshops are considered a pattern that may be ineffective in bringing about change in classroom procedures. For instance, short courses are often disjointed and offer little opportunities for teachers to engage in collaborative and/or reflective work with their colleagues (Meyer, 2006). Another challenge presented by short courses as a PD tool is that individual teachers may feel isolated during the duration of the course regardless how short it may appear due to a lack of interactional opportunities, and compressed timetables that

make it difficult for them to communicate or collaborate with colleagues (Cookson, 2005). Perhaps this situation is best captured by Cookson (2005, p.16), who observes that, “One of the ironies of teaching is that it is one of the most social occupations, but it is also one of most isolating professions”.

Lesson Study (LS) has been identified as one of the emerging and current approaches to teacher professional development (Akerson et al., 2017). According to the literature, the LS approach originated from Japan about the second half of the twentieth century. Its original motive was to offer teachers the opportunity to learn from their teaching experiences, a form of continuous professional development (Shuilleabhain, 2014). LS is a professional learning (PL) framework based on collaboration amongst teachers, and it aims to improve their professional (and student) learning (Warwick et al., 2016; Wood and Cajkler, 2017). It has become an important practice throughout the world and many scholars have highlighted its benefits and significance. For instance, it is suggested that LS combines all the key features that improve teaching and learning in an autonomous manner - such as brainstorming, interacting, engagement, collaborative activities, and ‘inquiry’ (Cordingley et al., 2004; Duncombe and Armour, 2004; Dudley, 2014b; Sachs, 2003).

Other unique selling points of LS as a professional development tool include the provision of opportunities for teachers to examine their practices in the classroom setting as well as opportunities for collaborative work among teachers (Ponte, 2017). Other merits of LS as a continuing professional development approach may include systematically deepening teachers’ PCK (Akerson, et al., 2017), broadening their understanding and helping them to develop their teaching skills and ability to observe and understand student learning (Lewis et al., 2012). LS may also be a process that teachers use to share and discuss their teaching activities while engaging in deep and grounded reflection (Chokshi and Fernandez, 2004).

Herawati (2003) identified the following aspects of the LS approach:

- students’ cooperation with others in their learning
- contextual teaching and learning
- life skills
- hands-on activities
- interactive process-oriented curriculum and syllabi development
- teachers and students’ autonomy (Herawati, 2003).

Specific to the Kingdom of Saudi Arabia (KSA), the prevailing practice in the field of education is the traditional method of training as designed by the General Administration of Training under the Saudi Ministry of Education. Such teacher training programmes appear to negatively impact on interactivity in particular. In addition, there are practical and logistical challenges such as the availability of training opportunities for all teachers, given the large number of teachers and the wide geographical spread (Al-Sultan, 2006; Saylor, 2014; Jacob and McGovern, 2015). It has, therefore, been argued that these deficiencies and the lack of modern teaching trends make the role of the teacher in the KSA more challenging (Al-Nazir, 2004; Badr, 2005; Farhoud, 2007; Al-Zahrani, 2008; Al-Dahsh, 2009; Al-Olayan, 2010; Al-Harbi, 2011; Khalil, 2014; Al-Ghamdi, 2014). Continuous teacher PD in the KSA has, therefore, been identified as one of the factors that can influence the improvement of teacher performance in the country. Nonetheless, this endeavour requires keeping pace with the latest developments in education and continuous lifelong learning. Given the considerable significance of PD to teachers and the entire educational sector, the MoE in the KSA has adopted a number of strategies, notably LS over the years to improve teacher performance. This study seeks to explore the use of LS within primary schools in Riyadh, with the intention to create a set of practical recommendations for the MoE in Saudi Arabia.

The LS approach is new in Saudi Arabia as it has only been applied for some few years now (MoE, 2018). Its adoption and application in Saudi Arabia has been part of collaboration between the Saudi Ministry of Education and the Japanese Ministry of Education within the framework of the Kingdom's Vision 2030. Specifically, the Kingdom's Vision 2030 aims to improve education and its processes and outputs, and to develop professional learning communities who can identify their problems and resolve them as well as produce new knowledge and employ it in schools (National Center for Educational Professional Development, 2018). However, there is a lack of clarity regarding the efficacy and/or compatibility of this approach with the Saudi educational system. Given that the educational learning environment in Japan differs remarkably from that of Saudi Arabia, it stands to argue that LS implementation success in one context may not necessarily translate to success in another context. Therefore, there have been calls to explore and evaluate the successes of implementing the LS approach in countries outside Japan (Fujii, 2014; Hourigan and Leavy, 2021). This study explores the extent of the success of its application, the nature of the practices and procedures that take place in it in Saudi Arabia. The study seeks to highlight and enhance the positive aspects, indicate the challenges encountered, and offer recommendations to overcome them.

1.2 Research Aims and Research Questions

The overarching aim of this study is to conduct a case study investigating LS practices utilised within primary schools in Riyadh, with the intention of creating a set of practical recommendations for the MoE in Saudi Arabia. The main research questions aim to provide comprehensive answers to the following:

1. What are primary school teachers and school leaders' perceptions of the impact of LS on developing content knowledge of Maths, Science and Arabic?
2. What are primary school teachers and school leaders' perceptions of the impact of LS on developing pedagogical content knowledge of Maths, Science and Arabic?
3. How does participation in LS influence school-based collaborative learning communities?
4. What are the perceived benefits of implementing LS in primary school context?
5. What are the perceived challenges in implementing LS in primary school context?

1.3 The Relevance of the Study

The Saudi MoE started a campaign and a shift in focus to school-based PL strategies as far back as the year 2010 (MoE, 2014). This initiative involved designing and tailoring PL in order to meet the needs of both schools and individual teachers (MoE, 2014). In 2015, the decision was taken by the Saudi MoE to utilise LS as a method to meet those PL needs. A pilot project was then initiated and implemented in approximately 500 primary schools across the country in Maths, Science, and Arabic Language (MoE, 2017). Essentially, the adoption and implementation of LS by the Saudi MoE was to increase professional knowledge, enhance and improve teachers' skills as well as increase teacher engagement and interactions with their students including content knowledge (CK) and pedagogical content knowledge (PCK) through school-based PD (MoE, 2017).

There seem to have been significant improvements in student achievement and teacher learning and collaboration since the implementation of LS in the KSA (Killion and Kennedy, 2012). In addition, other benefits have been achieved as a result of the LS model such as

high-quality PD activities. These activities have become more successful in focusing on the immediate work of teachers whose collaborative work is at the heart of job-embedded PD to improve the quality of teachers and enhance student achievement (Coggshall et al., 2012). Teachers have built a knowledge-based and collaborative learning environment that has allowed them to understand their subject more deeply than to participate in generic pedagogical strategies (Stewart, 2014). LS as a model of PD is an assessment-centred learning community, in which educators have numerous opportunities to use a multitude of different strategies to improve student academic achievement (Killion and Kennedy, 2012). Research has shown that teachers should enhance instruction by implementing and adapting new ways of promoting education while evaluating their new strategies to evaluate if they are successful enough to increase student achievement (Blank and De Las Alas, 2009). This study is therefore relevant in a number of ways including its timeliness and focus. Overall, the research outcomes contribute to the body of knowledge on the standard of school-based PD based on the Saudi system of education.

1.4 Problem Statement

The research aimed to explore teacher perceptions of the degree to which involvement in LS had an effect on their CK, PCK, and collaboration. While LS integrates many of the characteristics of PD employed by Saudi teachers and is considered to be successful by the most recent studies, it also embodies a number of socio-cultural aspects. These socio-cultural characteristics have the propensity to challenge the successful implementation of LS as a PD model outside Japan. Thus, it is essential to understand how, why and under what conditions LS is successful in improving CK, PCK and collaboration in Saudi primary schools. More specifically, it is important to understand how the involvement of teachers and their school leaders in the implementation of LS may potentially impact on teachers' learning including CK, PCK, and teacher collaboration. The research also focused on teachers' perceptions of the obstacles they faced while participating in LS and the supporting factors that enable the successful implementation of this PD endeavour.

1.5 Significance of the Study

As mentioned previously, the Japanese concept of LS is considered to be a fundamental model for teachers' PD. However, in the context of Saudi Arabia, there is a lack of literature

on LS and its implementation in primary schools. Given that the Saudi MoE only implemented a pilot of LS in 2015, it is highly likely that this study which used a hybrid methodology is the first of its kind in Saudi Arabia. This research is therefore highly significant in that respect since the outcomes might serve as a key resource for any future research regarding the Saudi experience with LS in primary schools. In addition, legitimate questions have been raised in the literature highlighting certain cultural assumptions underlying the LS model and the extent to which it can be replicated in other countries (Stigler and Hiebert, 2016). The outcome of this research could contribute to fill this gap, particularly in the case of the KSA as well as other similar contexts - religiously, culturally and politically. Furthermore, LS has been developed and utilised for many years in Japan where teaching is considered purely as a public activity. In this model, teachers' performance is observed, and critically discussed by colleagues, for teacher development purposes. However, the process of teaching and performance for teachers in Saudi Arabia is widely considered to be a private matter, and therefore it is more difficult to assess and analyse.

It could be argued that the implementation of LS requires a stable system and a longstanding commitment from the actors responsible for embedding the model throughout the country. This is difficult to attain in Saudi Arabia, as policies, rules, regulations, and staff are continuously changing. The findings of this study may be pivotal to the developing Saudi education system, in general, and teachers' PD in particular as they are likely to embrace the LS as a high-quality process of PD. Teachers may be able to shift their approach to teaching from "teaching as telling" to "teaching for understanding" through intense studying and sharing during the LS model (Lewis, 2002). Furthermore, LS is likely to serve as a mechanism for motivating Saudi teachers to become reflective professionals who use what they have learned from research-based lessons to review and incorporate future lessons jointly. This study's results would also add to the current literature by offering awareness of the role of LS in developing different forms of knowledge and enhancing the teaching-learning process. The findings of this research will provide insights into the effectiveness of LS in moving to more collaborative forms of PD.

In acquiring more knowledge about the effects of LS, researchers, educators, and administrators would be better able to assess whether or not LS is a viable method of school reform to be pursued. While LS has been shown to be successful (Hill, 2009; Chokshi and Fernandez, 2005; Lewis, 2002), this study will add to the current body of knowledge regarding the impact of PD on teacher learning particularly in contexts outside Japan. As

will be detailed in this study, research shows that PD works in Japan, the USA and other European contexts (Fujii, 2014; Hourigan and Leavy, 2021). However, there is still a need for more research on its efficacy outside these contexts, and this research contributes to this growing area of study. Given the peculiarity of the Saudi educational system and culture, the outcome of this study brings to the fore limitations of the PD model which may not have been captured in any of the existing research.

The research findings highlight the effects of LS and provide some indicators to policy makers that would help in decision-making, particularly regarding whether or not LS is a feasible educational reform measure to seek. While LS has proven to be successful outside of Saudi Arabia (Hill, 2009; Chokshi and Fernandez, 2005; Lewis, 2002), it is by no means a basis for its replication in Saudi Arabia. Therefore, the findings of this research could be helpful in informing and influencing such a decision in Saudi Arabia.

1.6 Research Design

The current research was conducted in the KSA, in particular in the Riyadh Region. It was designed to explore teachers and school leaders' perceptions about LS and its impact on CK and PCK of teachers as well as building collaboration.

Case study was considered a suitable research methodology for this study. Therefore, this research used a single holistic and exploratory case study design to explore teachers and school leaders' perceptions and experiences regarding LS implementation and impact on CK and PCK of teachers in four purposefully selected primary schools in the Riyadh region.

A mixed methods research design was used in this study to combine both qualitative and quantitative data. Overall, a total of 54 participant including 50 teachers and 4 school leaders took part in this research study. More specifically, 50 teachers answered the questionnaires and 12 out of them were interviewed in addition to 4 school leaders (See Chapter 6 for more in-depth discussion).

1.7 Contribution of this Research

This study contributes to the growing body of knowledge on LS and school-based PD. This work extends our knowledge of the implementation of LS in countries outside Japan by investigating different perspectives on LS implementation using a hybrid methodology. The findings from the present study make several contributions to the debates that can shape education policy not only locally in Saudi Arabia, but also internationally in different contexts. The findings provide a new understanding of the role of LS in developing different forms of knowledge for teaching. The study identifies five areas through which the knowledge and capacity of Saudi teachers could be enhanced as a result of the adaption and implementation of LS in the Saudi educational context. These are:

- Enhancement in the CK of teachers.
- Enhancement in the PCK of teachers.
- Building a PL community.
- Helping to minimise isolation.

However, sustainability remains a major issue to be resolved in Saudi Arabia, as in many other countries outside Japan which have adopted and introduced the LS model. Although this is not explored in detail in this study, this will be important in any future research.

The present study will go some way towards enhancing our understanding of LS as means of supporting the transition from individualistic to more collaborative forms of PD. The findings will show how the educational context provided by KSA can facilitate understanding how effective LS might be in moving to more collaborative forms of PD. Therefore, this research will serve as a base for future studies and its recommendations will help in understanding education reforms, especially school-based PD.

1.8 The Structure of the Thesis

The study is structured in the following order:

- Chapter one is an introductory chapter that provides some background information on the study and describes its importance.

- Chapter two provides an overview of the education system in KSA and an overview of teachers' PD in Saudi Arabia including new framework and standards for Saudi teachers.
- Chapter three presents the literature review of PD in-depth including the conceptions of PD, characteristics of effective PD for teachers, PD and professional learning, the importance of PD, PD and student achievement, and models of PD,
- Chapter four presents an in-depth literature review of LS including the conceptions of meaning and origins of LS, special characteristics of LS, significance of LS, steps of LS, challenges of implementing LS, variations in LS practices, an overview of LS in Saudi Arabia and other countries outside Japan, Japanese PD, the use of LS outside of Japan, LS as an approach to professional learning, overview of theoretical framework, and a theoretical model of LS.
- Chapter five details the research methods and methodology which include mixed methods reviews, data collection, research design, methods of data analysis and utilisation of research instruments.
- Chapter six presents data analysis results arising from questionnaires completed by 50 teachers. The chapter presents the evaluation of data collected from the quantitative phase of the research (the LS survey). It presents the results of rank, mean, standard deviation, t-test, one-way ANOVA for teachers' perception of the LS model.
- Chapter seven shows the results of data analysis arising from qualitative interview data analysis completed by participants (12 teachers and four school leaders). It used content analysis (CA) to present these findings.
- Chapter eight provides an in-depth discussion of the results derived from both qualitative and quantitative datasets.
- Chapter nine presents the major findings of the research questions and the main contribution of the study. It outlines recommendations from the study and the scope for further research.

Chapter 2 Background of Saudi Educational System

This chapter presents background information about the Saudi educational system and the context within which it operates. Specifically, the chapter provides an overview of the Kingdom of Saudi and explains the history of education there in order to set the context of the research and understand its development over time. Teacher training, professional development opportunities and professional standards for teachers are critically examined to better understand teacher education, what has been done to improve the quality of teachers and teaching and the challenges of implementing professional development in the Saudi context.

2.1 An Overview of the Kingdom of Saudi Arabia

The Kingdom of Saudi Arabia (hereafter, KSA) is located in the Arabian Peninsula at the southwest corner of the Asian continent. It is located at the crossroads of Europe, Asia and Africa. The Kingdom is surrounded by the Red Sea from the west, Yemen and Oman from the south, the Arabian Gulf and United Arab Emirates and Qatar from the east, and Jordan, Iraq and Kuwait from the north. The Kingdom is divided into thirteen regions (Al-Riyadh, Makkah Al-Mokarramah, Eastern Region, Aseer, Al-Madina Al-Monawarah, Jazan, Al-Qaseem, Tabouk, Hail, Najran, Al-Jouf, Al-Baha and the Northern Borders), with regional governors from the royal family (Website of Saudi e-Government Portal, 2015). The Kingdom has an estimated population of 27,136,977 of which 18,707,576 are Saudi nationals (The Saudi Arabia National Census Data, 2010; Website of Saudi e-Government Portal, 2015). In 2015 the total Saudi government expenditure budget was set at SR 860 billion, equivalent to \$229.3 billion. The education sector was allocated a budget of SR 217 billion (US \$57.9 billion), representing 25% of the total budget for 2015 financial year (Website of General Authority for Statistics in Saudi Arabia).

2.2 History of Education in the KSA

The Saudi educational system has undergone major changes over the past years. According to historians, the three key stages in the history of education in the KSA are the period prior to 1924, the period between 1924-1953, and the period after 1953 (Assalloum, 1991; Alsalman, 1999; Alkhouter, 2002). The following subsections explore each of these stages.

2.2.1 The Period Before the Establishment of the Present KSA

This was the period of the Ottoman Empire during which there was no formal education. During this period, students only went to small and non-formal classes that were closely associated with mosques (Masjed) to learn basic Arabic language, reading and writing as well as memorizing the Holy Qur'an (Thomas, 1968). These classes were named "Kuttab" and were facilitated by teachers or Imams (Mosque leaders). Another feature of the educational system during the Ottoman Empire is that access to education was limited only to boys who could afford to pay the required fees (AlRomi, 2001). Therefore, the educational system that existed prior to the establishment of the present day KSA was very limited in terms of access and challenged by socio-economic, religious, as well as political factors (Hakeem, 2012).

2.2.2 Under the Reign of King Abdul-Aziz - 1924-1953

The formal unification of the Kingdom was announced on September 18, 1932 under the reign of King Abdul-Aziz. Prior to this formal unification, the King had initiated steps towards formal education in Saudi Arabia in 1924. By 1925, the Directorate of Education and many primary schools in Makkah Al-Mukarramah and Al-Madinah al-Munawwarah were established. By 1939, Makkah Al-Mukarramah alone had 20 schools that covered all the educational key stages and had many students enrolled (AlSalman, 1999). This success encouraged the Saudi government to establish more schools in other regions and cities of the Kingdom.

The establishment of the Department of General Knowledge and allocation of more resources were further gains made in this period. However, the majority of the Saudi population still lacked access to education and were still characterized as illiterates despite these efforts (UNESCO, 1996).

2.2.3 The Third Stage From 1953 Until the Current Time

The year 1953 and beyond is often tagged the dawn of the new era in development of education in Saudi Arabia. It began with the establishment of the Saudi Ministry of Education (hereafter, MoE) on December 24, 1953; which was made part of the Council of Ministers and headed by the then Prince Fahad bin Abdul-Aziz. This marked another period during which the Saudi government supported the education sector through policies, funding and programmes (Thomas, 1968; AlKhouwaiter, 2002).

In terms of policy, the Saudi educational system is based on Islamic religious values and the Holy Qur'an. It aims to make education more efficient and readily available for the Saudi society in order to develop economically, socially, and religiously. One of its main objectives is to develop an important role in the field of scientific research in order to acquire and apply global advancement in the different fields of life and the economy. In addition, it aims to train and develop sections of the community to get high qualifications in a diverse range of disciplines and specializations in order to develop and build the country (MoE, 2015). In terms of funding, the government provides free education for all students and gives financial help for students from poor backgrounds. Students in universities also receive monthly allowances of around \$200 (AlRomi, 2001). Additionally, all students have access to free transportation and textbooks.

In terms of programmes, the educational system in Saudi Arabia is heavily based on Islamic ethics and values, and the education of males and females is segregated. Religion constitutes an essential and integral part of education, sociology, economics, medicine, psychology, and law in the Kingdom (Website of Ministry of Education, 2015). This means that, as much as possible, all curricula in the Saudi educational system remain inseparable from their Islamic roots. The Islamic religion is studied at all stages alongside other subjects within the approved curricular. However, in recent years the Saudi MoE has started a project for the

development and improvement of the Saudi educational system with the aim of meeting international standards (MoE, 2015).

Administratively, the management and administration of education in Saudi Arabia is the responsibility of the Saudi MoE. The same ministry is also responsible for the education of boys and girls as well as higher education (colleges and universities). In addition, technical training is under the responsibility of the general organization for technical education and vocational training (MoE, 2015). The educational system in the KSA consists of the following levels: Pre-Elementary Level (ages 4-5 years), Elementary Level (ages 6-12 years), Intermediate Level (ages 12-14 years), and Secondary Level (ages 15-19 years).

According to OECD (2020), to fulfil its commitment to developing a high-quality education system as outlined in the ambitious reform agenda known as Vision 2030, Saudi Arabia has implemented education reforms achieving significant gains in school enrolment. Despite the remarkable progress Saudi Arabia has made in increasing access to education and achieving universal enrolment rates at primary and lower secondary levels, based on OECD (2020), most young Saudis leave school without having mastered the basic competences required to achieve success in their future academic and professional endeavours. Therefore, OECD (2020) concluded that transforming teaching and the teaching profession is crucial for the success of education reforms in KSA.

To understand how Saudi Arabia has been strengthening the quality of the teaching profession to achieve its ambitious educational goals, the next sections will critically examine teacher education in the Saudi context in detail.

2.3 Teacher Selection, Training and Development

The MoE have certain criteria to recruit teachers. For the last few years, teachers have been required to get a four-year Bachelor's degree and an Education Diploma as well as pass a licensing examination (MoE, 2015). The technique for selecting teachers can also be classified under six categories including: (a) annual planning (b) determining occupation (c) sourcing candidates (d) checking applicants (e) choosing the best applicants and (f) employing applicants (MoE, 2015). Table 2.1 below provides a summary of the qualifications required for teaching in the KSA.

Level of education	Institutes and colleges	Admission requirements	Length of studies	Qualification upon graduation
Kindergarten	Female teachers secondary institute	Intermediate school certificate or equivalent	Three years	Secondary Institute Diploma
Elementary education	Girls' intermediate education colleges	General secondary school certificate or equivalent	Four years	Intermediate College Diploma
	Girls' developed education colleges	General secondary school certificate or equivalent	Four years	Bachelor's (BA) degree
	Colleges of education	General secondary school certificate or equivalent	Four years	BA degree
	Teacher colleges	General secondary school certificate or equivalent	Four years	BA degree
Intermediate education	Colleges of education	General secondary school certificate or equivalent	Four years	BA degree
Secondary education	Girls' university colleges	General secondary school certificate or equivalent	Four years	BA degree in any subject
Technical secondary education	Other university colleges	General secondary school certificate or equivalent	Four years	BA degree in any subject

Table 2-1 Qualifications required for teaching (1996) (UNESCO, 2010)

Throughout the last 30 years the qualities for the development of teachers have risen gradually, compatible with the general growth of the Saudi educational system. Teacher development planning has therefore become an important part of the Saudi education system. For instance, there are 80 teacher training centres throughout the KSA with around 400 trainers. These centres provide training programmes for teachers in teaching methods, computer skills, and PD. All teacher training centres are under the supervision of the General Directorate of Training and Scholarship within the MoE (MoE, 2015).

In terms of teacher professional development (PD), this has been part of the Saudi educational system since 1975 (El. Deghaday et al., 2015). Similar to the Japanese system, CPD in Saudi Arabia is centralised under the control of the MoE. Despite its centralised management, OECD (2020) indicated that the management of teachers is fragmented in KSA. This may result in affecting the quality and consistency of the provision of teacher education in the Saudi context (Alhammed et al., 2004). For example, the Saudi MoE is responsible for most facets of teacher education, from curriculum development to teacher recruitment and training, as well as equipping schools and the building of infrastructure (Motoaly, 2004). The Saudi MoE also has the responsibility of setting the parameters for PD and training of teachers. These PD programmes are normally developed at the national level and delivered regionally through Local Education Authorities (LEAs). The LEAs are responsible for organising the training courses at a local level and communicating with schools to enable teachers to attend the courses they need.

In 1998 an independent department responsible for teacher training was established by the Saudi MoE called the General Administration for Educational Training and Scholarships (GAfETS). This department is now responsible for teacher training as well as internal and external teacher scholarships (Almazroa and Al-Shamrani, 2015). Under the GAfETS, CPD is delivered through specialised centres in each region with the overall supervision being held by the training departments with the MoE. It is worth mentioning that as part of their role, school principals and teacher supervisors from Directorates and Education Offices carry out appraisal and teacher professional development with teachers. In the light of this background, OECD (2020) argued that teachers in the Saudi context feel confused about what guidelines they are expected to adhere to, who is responsible for evaluating them and to whom they should turn for support when needed.

Broadly, there are two stages of teacher training in KSA: pre-service and in-service (a form of CPD). These stages are examined in detail below.

2.4 Pre-service Training

Pre-service teacher training programmes usually provide student teachers with general pedagogical knowledge. Training programmes are designed, recognised and organised to train future teachers to formally enter into the profession at a specified level of education. However, several issues have been highlighted about pre-service teacher training and development in Saudi Arabia. For instance, the results of TALIS (OECD, 2019) showed that

72% of teachers received instruction on subject content, pedagogy and classroom practice during their training which is lower than the average share across the OECD countries and economies who took part in the survey (79%). In addition, only 37% of teachers took part in formal or informal induction prior to joining their school which is lower than the average of OECD countries and economies (42%).

According to Algarfi (2005), many students who graduate from teacher training programmes at Saudi universities and colleges consider their training to be inadequate, out-of-date and that they were not fully competent for the current world of teaching. It has also been highlighted that these training programmes lacked good content, efficient structure and useful management (Almazroa, 2006; Alsounble et al., 2008). The literature has further highlighted that there is a lack of strategic planning to build the knowledge and skills of teachers in Saudi Arabia after their pre-service teacher training (Aldkheel, 1992). Other issues highlighted include the lack of focus on effective classroom management, limited use of technology, and effective communication skills (Alnassar, 2004). Musalam (2003) highlighted that many newly qualified teachers do not receive adequate support once they are in a professional role. This includes direct support as well as tangible aids such as materials and teaching aids as well as knowledge of how to plan lessons and which teaching methods to use. The benefits of mentoring which offers new teachers with extra individualised support to develop their teaching practice are widely recognised in the literature (Beck and Kosnik, 2014; Forde, 2011; Murry, 2014). However, compared to 22% of novice teachers who have mentors across the OECD countries and economies, 19% of novice teachers in KSA are mentored (OECD, 2019). Teachers are supported by school supervisors who may not be well-qualified to offer support (OECD, 2020). Alhajeri (2004) argued that PD was not always supported by school leaders as they struggled to find cover for teachers who would attend CPD sessions. Such a lack of support could result in teachers leaving the profession as they feel unsupported and that they will not progress (Darling-Hammond, 2003).

Other issues identified include the inadequate or lack of qualified teachers in Saudi Arabia. With many schools having unqualified teachers, teachers not having adequate understanding of complex learners' needs and the delivery of teacher training in KSA in different locations can result in inconsistent and varied training (Alhammed et al., 2004). Therefore, the current provision of pre-service teacher training in Saudi Arabia is inadequate to meet the current challenges, improve staff retention and develop a more skilled teacher workforce. Hence,

more initiatives are needed to develop the current policy in KSA to keep up with the current international educational trends.

2.5 In-service Training or CPD

There have been some positive steps taken by the Saudi MoE in recent years to improve the teaching profession, particularly in relation to in-service training or CPD. One action taken includes the provision of workshops and tutorials across different LEAs. This suggests that the Saudi MoE does recognise the importance of the quality of teaching (Alhajeri, 2004). However, Saudi Arabia performed poorly in the 2011 TIMMS study which necessitated improvement in the country's CPD programme (Ministry of Education, 2014). The Saudi MoE has therefore undertaken mass reforms in science and mathematics education in particular which involved teachers focusing on deepening their subject knowledge. This is aimed at enabling them to provide more 'hands-on' engagement as opposed to the very surface level content they previously used (Al-Abdulkareem, 2004; Al-Ghamdi and Al-Salouli, 2013). These adaptations in the revised science and mathematics curriculum also require teachers to use their enhanced knowledge to support the critical thinking of students through inquiry-based practices and problem-solving (Forawi, 2012; Santau, et al., 2011). It is argued that only by having a strong understanding of the subject area themselves can teachers support such enhanced learning.

Statistically, the annual State of Education report (General Administration of Educational Supervision, 2006) reported that only 5% of teachers were trained and these were on short training programmes (3-10 days). However, the results of TALIS survey showed that participating in in-service training has become more common among teachers and principals recently as 86% of teachers and 95% of principals took part in at least one CPD activity in the year before the survey (OECD, 2019). It is important to note that the results in KSA which OECD (2019) reported are still lower than the average share across the OECD countries (94% of teachers and 99% of principals). Therefore, the survey revealed that teachers in the Saudi context do not take part in CPD as much as teachers from many other different countries around the world.

Regarding the common types of CPD opportunities OECD (2019) investigated, 73% of teachers in KSA took part in courses and seminars while 54% of teachers attended peer learning and coaching opportunities. The lack of mentoring programmes in KSA could be the reason for this low share as indicated by Alharbi (2011). It is worth mentioning that

although participating in courses and seminars is considered one of the most popular CPD activities across the OECD, the report highlighted that among the most impactful opportunities the teachers across the OECD indicated are the ones based on collaboration and collaborative approaches to teaching. Therefore, there is a need for CPD in KSA to recognise the potential contribution from a number of stakeholders with interests in in-service teachers which could include mentoring programmes which do not exist in the Kingdom (Alharbi, 2011).

2.6 Challenges of the Current CPD Programmes

Although OECD (2019) suggested that most teachers in the Saudi context expressed their satisfaction with the training they had as 75% of teachers indicated the positive impact of their training on their teaching practice, this share is lower than the average across the OECD (82%). The report emphasised the importance of attending impactful training to show higher levels of job satisfaction and self-efficacy. The results obtained from several studies on the provision of CPD opportunities in KSA primarily including Aldahmash and Alshamrani (2012), Aljabur (1992), Alsabagh (1998), Badi (1996) and OECD (2020) revealed that the provision is inadequate, it fails to meet the needs of the sector and doubts have been raised regarding its quality and relevance to teachers' needs. It was suggested that while teachers in KSA were encouraged to participate in CPD, they were usually not involved as agents in the creation of the activities, resulting in cases where some of the opportunities were not wholly relevant to actual classroom practice (Colbert et al., 2008). Most training supervisors who deliver CPD opportunities may not be well-experienced in providing training courses to enhance other teachers' skills (OECD, 2020). Therefore, the CPD programmes run in the Kingdom do not provide the relevant knowledge and understanding of teaching and learning techniques that teachers mostly need to develop their skills and knowledge (Alhogail, 2003; Alhammed, 2004; Aldeep, 2004; Alkanem, 2005).

Almazroa et al. (2014) pointed out that most Saudi teachers are not competent enough to deliver the new curriculum. Although the qualification needed to enter the teaching profession is a Bachelor's degree, due to the lack of adequate number of students entering the profession, those without degrees may be accepted to fill in the gaps in subject areas including science and mathematics. Furthermore, there is usually no minimum grade requirement for degree holders to enter the teaching profession. Therefore, candidates with lower grades are commonly accepted into teaching which further impacts the quality of

teachers in the profession. Bringing in less qualified teachers is likely to lead to a CK deficit and less understanding of educational pedagogy. Based on Al-Abdulkareem (2004), a competency test for new teachers in the academic year in 2004 indicated that only 27% of applicants passed the test with a grade of 40% or above. Therefore, the introduction of low-quality teachers into the workforce has an impact across the teaching profession in Saudi Arabia as standards across schools can slip. A number of studies have found that teaching methods are affected due to having underperforming teachers who use non-creative approaches (Al-Mutairi, 2006; Buthaina, 2006).

The Excellence Research Centre for Science and Mathematics Education (ERCSME) aimed to improve the CPD available by looking at the impact of CPD on the teaching practices in Saudi science and mathematics classrooms and making recommendations for improvement, as well as supporting the implementation of new practices. Whilst this was the intended outcome there were issues in the training itself as it was typically designed in an unsystematic manner (Almazroa and Aloraini, 2012; Mansour et al., 2013).

The studies presented thus far provide evidence that more research is required to develop a more comprehensive and needs-based plan for Saudi teachers, particularly in STEM subjects, if the country is to meet its Vision 2030 ambitions (Aldahmash and Alshamrani, 2012). It is apparent from the results of OECD (2019) that developing advanced ICT skills, teaching in multicultural and teaching students with special needs are examples of the most needed areas of CPD that teachers in KSA identified. The findings of the present research may further help in understanding teachers and school leaders' needs and their perceptions regarding the use of lesson study as a teacher development strategy based on their own experiences.

2.7 Way Forward

Despite developing and implementing a new curriculum in Saudi Arabia to improve the quality of teaching and learning, research shows that most Saudi teachers are not competent enough to deliver the new curriculum (Almazroa et al., 2015). In addition, the available CPD opportunities are inadequate to meet the demands of the improved curriculum (Almazroa et al, 2015) which suggests that what has been done is not enough to develop the teaching practice in the Saudi context. Ideally, PD and curriculum reform should occur at the same time and any CPD should be developed in line with the new curriculum for the reforms to be as effective and meaningful as possible. Mansour et al., (2012) emphasised that CPD

should not be solely training activities, but it needs to involve comprehensive learning about the new framework to deepen teachers' knowledge of the content and ensure that there is meaningful delivery of the curriculum once back in the classroom. The responsibility for ensuring that such connectivity occurs falls to the MoE. Analysing the intended learning outcomes is recommended first prior to designing PD opportunities to provide the required level of interconnectivity. Increasing the number of hours allocated for participating in CPD annually from 10 to 18 hours by 2020 is recommended (OECD, 2020). It is hoped that the introduction of major policy initiatives including developing Teacher Standards and establishing National Institute for Professional Educational Development (NIPED) which carries out several training opportunities and is promoting lesson study as part in collaboration with the Japanese International Cooperation Agency will help strengthen teaching in KSA (OECD, 2020). The next section presents the professional standards for teachers in the Saudi context.

2.8 Professional Standards for Saudi Teachers

Organisations and agencies such as the International Association for Educational Assessment (IAEA) exist in many countries to lead on education policy development and take responsibility for the development of teacher CPD programmes (Price et al., 2012). In Saudi Arabia schools, rote learning is the norm. Engaging in less problem-solving and critical thinking necessitated developing a standards framework to outline the knowledge, skills and values that should underpin the teaching profession which teachers should get from any training programmes (Shannag et al., 2013). Such standards provide guidance on teacher training programmes and outline expectations of students once they reach the profession. This format moves beyond a traditional approach where the focus is primarily on the content to be delivered to a place where learning and teaching pedagogy are explored. It is hoped that developing the standards will provide a more-rounded base for teachers and will enable deeper learning to be delivered. It also creates a database that researchers can use to explore the effectiveness of different approaches to educational standards (Ingvarson, 2012; MacBeath, 2012).

The education sector in Saudi Arabia has been committed to supporting the teaching profession through the provision of relevant and useful professional standards that teachers can use to benchmark their progress, and that of learners. The King Abdullah bin Abdul Aziz Public Education Development Project (known as the “Tatweer” project) was carried out by

The National Centre for Assessment which signified recognition of the importance of creating a high-quality education framework in Saudi Arabia. Nevertheless, the absence of a clear strategy to implement the standards may affect understanding them and hinder achieving their aspired aims (OECD, 2020).

The next section explores how professional standards are developed for teachers in Saudi Arabia at two levels: general standards and subject matter standards. It also shows how these standards link to qualifications and examinations for trainee teachers.

2.9 New Framework and Standards for Teachers

Over the past few years, a range of committees featuring experts in their fields have been established to create new framework and standards for teachers. Committee members were guided through the structure of the framework and how content should be developed to fit it. They developed the pedagogy from which the subjects would be taught and the curriculum delivered. This framework is intended to reach across all teaching levels, with specific standards being created for subject and class level. The committee also determined the role and responsibility of teachers and the principles they should adhere to. The four main levels of the framework structure are outlined in Table 2.2 below.

Level	Statement
1. Principles	Guiding vision of quality learning and teachers' work
2. Domains	Organising categories for the teaching standards
3. Standards	Description of teachers' knowledge and skills within each domain
4. Elaborations	Elaborations of the standards for particular fields of teaching, used for designing performance assessments and rubrics

Table 2-2 Levels of statements within standards framework.

As the above Table shows, Level 1 takes care of the Principles which include abstracts, and generic statements that outline the long-term values that teachers should be guided by. These Principles are not assessed. Level 2, that is Domains, outlines the categories that teachers will work on. Further, Level 3 – that is, Standards, details what standards are used across the content that is featured in Level 2. This includes the benchmarks of where teachers should be in relation to what they are delivering. Finally, Level 4, that is Elaborations, provides further details by describing how the teaching should be carried out – that is, through teaching styles or specific pedagogy.

Table 2.3 below details the 20 sub-standards that exist within the various domains of teaching. These generic statements provide more guidance on specific and measurable actions to be taken.

Domains of teaching	Standards	Sub-standards
Professional knowledge	1. Knowledge of students and how they learn	4
	2. Mastering basic skills of literacy and numeracy	6
	3. Understanding the central concepts, methods of inquiry, structures of the discipline, and pedagogy specific to the discipline	Elaborated at teaching fields level
	4. Knowledge of general pedagogy	5
	5. Designing coherent learning programmes	4
Promoting learning	6. Creating opportunities for, and advancing student learning	5
	7. Assessing student learning and providing useful feedback	5
Supporting learning	8. Establishing a respectful and supportive environment for learning	4
	9. Establishing a culture of learning and high expectations for student achievement	2
Professional responsibility	10. Working productively with school committees and colleagues to improve teaching and learning	3
	11. Continually improving professional knowledge and practice	3
	12. Understanding of the professional duties of Saudi teachers	2

Table 2-3 The framework of teaching standards.

The third standard in the framework relates directly to each area of teaching and will be guided by the following factors:

- factual information in the discipline, its organising concepts, key questions and ideas central to the discipline.
- skills, patterns and processes of reasoning and inquiry for the discipline.
- the historical developments, assumptions and debates for the discipline.
- academic language of the discipline, the purpose of the discipline, and the connections between key concepts of the discipline and other disciplines.
- how new knowledge is created in the discipline, including forms of creative investigation.
- knowledge of key issues and developments in the content area.
- relevance of the discipline to wider needs and issues in society.
- the habits of mind that typify reasoning, questioning, experimentation and problem-solving in the discipline.
- special teaching methods for pedagogical purposes.

Standards for teaching 22 disciplines were also developed involving:

- Arabic language, Islamic studies and the English language
- geography, history
- chemistry, physics, biology, mathematics (primary and secondary school), science, computers
- early childhood education
- physical education, art education, and library and information
- hearing disability, learning difficulties, autism, intellectual disability, and visual disability

It is important to point out that although most of the elements in the standards are in line with teacher standards developed around the world, OECD (2020) recommended that in Professional Knowledge, the standard needs to lay particular emphasis on developing

pedagogical content knowledge as one of the leading predictors of student achievement. This is one of the major criticisms of the standards in the Saudi context. Another weakness which OECD (2020) revealed is the lack of teacher involvement in the development of the standards which is vital to understand their perceptions of teaching and development needs.

2.10 Chapter Summary

In this chapter, the context in which the study was conducted is analysed. The historical development of education in Saudi Arabia highlighting the changes and transformation that have taken place over the course of time and history is described. It has been shown how over time, the education system in Saudi Arabia has experienced various reforms to develop the quality of teaching and learning. Developing professional standards for teachers and establishing new training centres are among the most ambitious initiatives. Despite some remarkable achievements in the Saudi context, developing clear plans to implement improvement strategies, carrying out high quality training opportunities and ensuring consistency in the provision are all needed to strengthen the quality of teacher workforce and attain the ambitious education goals set out by Vision 2030.

Chapter 3 Professional Development

At the beginning of the new millennium, educational reforms were a priority in most countries of the world including KSA. Professional development (hereafter, PD) of teachers, in particular, has become one of the most significant factors in these educational reforms primarily because of its significance and relevance to teaching and learning. In addition, there seems to be a causal relationship between improvements in PD and improvements in student learning outcomes (Villegas-Reimers, 2003). This chapter reviews the literature on PD as a core component of education reforms. The chapter provides an in-depth examination of PD as a term and the relationship between professional development and professional learning (PL). The chapter analyses the different models of PD and explores the significance of PD. Due to the greater emphasis on the link between effective PD and student achievement, the chapter develops an understanding of PD and its proposed alternative the Theory of Action and, finally, the connection between PD and student achievement. The review of the literature on PD models will facilitate understanding LS as a strategy for supporting PD based on studies conducted world-wide.

3.1 Concept of Professional Development

Historically, there has been much discussion about whether teaching should be defined as a profession or an occupation, in other words whether teachers are professionals or simply workers (Hoyle, 1995). Professionalism implies a coherent set of values, ideas, perspectives, and beliefs held by the individual teacher, rather than a series of outwardly imposed institutional norms that must be adhered to although there will be more general norms such as that knowledge ought to be pursued, which are in a sense external and which all professionals would be expected to meet (Mitchell, 2013). In the former case, where teachers are expected to have a coherent set of values, teaching is composed of professionals and is thus a profession. In the latter case, where teachers are expected simply to adhere to a set of external institutional norms, teaching is composed of workers, and is thus an occupation (Mitchell, 2013). PD is, thus, perhaps best understood in the context of understanding teachers as professionals.

In a generic sense, 'PD' refers to such things as specialist teacher training, formal educational qualifications such as degrees, or any other methods which may be used to help educators improve their professional knowledge, competencies, and effectiveness. The idea of teacher development has expanded from simple workshops and short-term courses to a far-reaching system of continuing education (Quattlebaum, 2012). Glattenhorn (1987) argued that the growth of teachers is attained by their continued acquisition of experience and reflection upon their professional practice. This notion of PD is wider than career development, which is defined as a development that comes to teachers through the professional cycle – i.e. the professional cycle is a PD procedure in which teachers plan collaboratively and they do lessons aligned to their educational system standards (Glattenhorn, 1987).

Along a similar line, Day (1999) provided a broader definition of PD conceptually which includes

... all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives (Day, 1999, p. 4).

In contrast to this definition, other contributors have somewhat provided a narrower view of PD. Broad and Evans (2006), for example, argued that PD as a concept implies specific learning methods, which lead to specific practices, without the broad, psychological aspects that Day (1999) included. Darling-Hammond et al., (2009) focused on those aspects of PD which most obviously related directly to learners' outcomes. Similarly, PD has been defined as an operation and activities prepared for teachers in order to increase their knowledge, skills, and attitudes, which lead ultimately to improve the learning of pupils (Bell and Gilbert, 1996; Guskey, 2000; Feiman-Nemser, 2001; Mizell, 2010).

The term 'PD' also refers to activities that include:

- An integral part of school and local educational agency strategies for providing educators (including teachers, principals, other school leaders, specialized instructional support personnel, paraprofessionals, and, as applicable, early childhood educators) with the knowledge and skills necessary to enable students to

succeed in a well-rounded education and to meet the challenging state of academic standards; and that,

- PD is sustained through intensive, collaborative, job-embedded, data-driven, and classroom-focused activities that) (Learning Forward, 2015).

The concept of PD is not only used for teachers' development, but for the other purpose of building confidence as demonstrated above. Most employees including lawyers, doctors, accountants, educators, engineers and people in different occupations and businesses also engage in PD to acquire new knowledge and skills which will increase their performance on the job (Mizell, 2010). Researchers often use other names for PD, for instance, in-service training, staff development, continuing education, or professional learning.

For the purposes of this study, it is necessary to clarify what is meant by the term 'PD'. PD encompasses the procedures and actions which individual teachers can undertake in order to enhance their ability to perform better as teachers. This implies that those undertaking the development are already teachers, and thus that they are members of the teaching profession. It, however, leaves open what enhancing one's ability to perform better as a teacher amounts to. This is deliberate - as there is a wide range of possibilities to do so.

There is evidence that some PD programmes do not have a measurable impact on instructional practices or teachers' knowledge. For example, in their investigation of 25 evaluation studies between 2004 and 2007 on teacher PD programmes in Science and Mathematics, Blank et al., (2008) indicated that two thirds of these programmes did not display measurable impacts on instructional practices. The study further suggested that a majority of PL programmes needed sufficient ongoing activities to support learning for teachers when they come back to the classrooms. The study concluded that only a small number of the included programmes utilized a school-based model for teacher learning in which teachers learned collaboratively with their colleagues (Blank et al., 2008). The conclusion of this study provides some credence to the assertion that not all PL has a positive effect on instructional practices, but the characteristics and quality of the PL models are crucial to the outcome. Table 3.1 below provides a summary of these characteristics that affect the PD of teachers based on a synthesis of studies.

Research Study	Characteristics of Effective Professional Development
Hiebert et al. (2002)	<ul style="list-style-type: none"> • School-based • Long-term • Collaborative • Focused on student learning • Linked to curricula
Supovitz et al. (2000)	<ul style="list-style-type: none"> • Content-rich • Intensive • Long-term experiences • Model preferred teaching strategies • Connected to classroom practices
Garet et al. (2001)	<ul style="list-style-type: none"> • Active learning • Collaboration with like teachers • Ongoing
Darling-Hammond et al. (2017)	<ul style="list-style-type: none"> • Content focused • Active learning experience • Collaboration in job-embedded contexts • Models and modelling of instruction to show what best practices look like • Coaching and expert support • Platform for feedback and reflection, and sustained duration

Table 3-1 Summary of Characteristics of Effective Professional Development for Teachers.

3.2 Professional Development and Professional Learning

PD and PL as concepts have been used interchangeably in the literature, but some educationalists have attempted to distinguish between them (Cole, 2004; Timperley 2011; Liberman and Miller, 2014). According to Timperley (2011), the concept of PL has become preferred to the concept of PD because PL focuses more on pupils' learning and situates teachers' knowledge and skills directly in relation to that. Cole (2004) also explains some differences between PD and PL as follows:

- PL may happen in different ways more than PD.
- PL improves the effectiveness of teachers because they need to use learning. PL activities enable educators to learn new knowledge and skills that improve students and teaching process.

- PL enables educators to learn by many activities that they design for themselves, while most PD programmes and activities which are provided for teachers are already designed by policy makers.
- PL can occur within designed programmes for PD as coaching, mentoring, and peer training that makes the term of PL used more than PD.
- PL locates the educators at the heart of the action.

In summary, PD is more teacher-focused while PL is more learner-focused. However, reviewing the literature shows that there is a lack of agreement regarding the clear distinction between PD and PL. For the purposes of this study, the concepts of PL and PD will be treated as overlapping and both will be used interchangeably.

3.3 Models of Professional Development

Internationally, researchers have become more interested in continuing professional development (CPD) for teachers in recent years. According to Hoban (2002), although there is an obvious growing interest in this area by way of research, there is still a lack of literature which focuses on CPD models in a comparative sense. It is thus argued that the current CPD models are country and/or context specific (Villegas-Reimers, 2003). This section explores the existing literature on CPD models to understand their purposes and indicate how these models guided this present study. Specifically, previous studies which primarily include Villegas-Reimers (2003), Lieberman (1996) and Kennedy (2014) are explored, highlighting their strengths and limitations as well as identifying where lesson study which is the particular focus of this research maybe positioned.

Villegas-Reimers (2003) summarised models of professional development into two groups (see Table 3.2). The first group characterises models which need co-partnership with institutions and organizations. This co-partnership can take differing forms – e.g. top-down or bottom-up - and degrees – e.g. more symmetrical, or asymmetrical with one of the partners leading. The second group characterises models which are implemented by small groups directly in relatively local environments such as classrooms or schools. Most of the models in the second group have been named as techniques rather than models. In addition, most of the models in the first group utilise the ‘techniques’ mentioned in the second group. The chart below describes the model and technique in each group.

Organizational partnership models	Small group or individual models
Professional-development schools	Supervision: traditional and clinical
Other university-school partnerships	Students' performance assessment
Other inter-institutional collaborations	Workshops, seminars, courses, etc.
Schools' networks	Case-based study
Teachers' networks	Self-directed development
Distance education	Co-operative or collegial development
	Observation of excellent practice
	Teachers' participation in new roles
	Skills-development model
	Reflective models
	Project-based models
	Portfolios
	Action research
	Use of teachers' narratives
	Generational or cascade model
	Coaching/mentoring

Table 3-2 Models of PD. Adopted from Villegas-Reimers (2003, p. 70).

However, Lieberman (1996) identified three types of PD:

1. Direct teaching (conferences, courses, consultations, workshops).
2. Learning in school (peer coaching, mentoring, critical friendships, action research).
3. Out of school learning (learning networks, visits to other schools, and school-university partnerships).

As previously mentioned in Chapter 1 (section 1.1), lesson study depends on teacher collaboration to improve teaching and learning in school. Therefore, this PD model which is the focus of the current study can be positioned within the second type of PD models Villegas-Reimers (2003) and Liberman (1996) identified in their frameworks.

In the Scottish context, Kennedy (2014) identified nine models of PD (shown below in Table 3.3) grouped into three categories, which are based on the ability to affect teacher practices. These groups include transmission, transition, and transformation. These models stand along a continuum beginning from the transmission, to transition, and to the transformation phases in an order of growing advancement to autonomy (Kennedy, 2014).


Model of CPD	Purpose of model
The training model The award-bearing model The deficit model The cascade model	Transmission <div style="position: absolute; left: 150px; top: 50px;">  <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Increasing capacity for professional autonomy </div> </div>
The standards-based model The coaching/mentoring model The community of practice model	Transition
The action research model The transformative model	Transformation

Table 3-3 Models of continuing PD. Adopted from Kennedy (2014).

As will be explained in detail in the next chapter, lesson study may fit within transformative approaches near the end of the spectrum as it resonates with some aspects of Kennedy’s community of practice and action research models. Therefore, to better understand these models, their purposes and their capacity for supporting teacher autonomy and transformative practice, Kennedy’s (2014) models are detailed below.

3.3.1 The Training Model

The training model was used by most educational systems in the past as the only kind of PD for teachers (Villegas-Reimers, 2003). This model of teachers’ development offers a chance for them to bring up-to-date the knowledge and skills needed to maintain their capabilities (Kennedy, 2014). The training model typically comprises of short-term training courses and workshops which can be provided in one day or several days (Villegas-Reimers, 2003). Experts in the field of PD generally deliver this model of CPD in order to determine the training agenda (Kennedy, 2014). One of the strengths of the training model is that it can be used as a strong strategy to provide specific information to a large number of participants

(Kennedy, 2014). However, the passive role teachers play in this model and the limited view of teaching and learning are among the limitations of this PD model (Beck and Kosnik 2014).

3.3.2 The Award-bearing Model

The award-bearing model provides opportunities for teachers to undertake accredited courses by institutions and organisations such as colleges and universities which improve their knowledge and skills (Kennedy, 2014). The model allows teachers to acquire a degree, diploma, or certificate upon finishing the course - hence the name, award-bearing model. Relative to the training model, this model appears more credible in expressions of quality emphasis (Kennedy, 2014).

3.3.3 The Deficit Model

The focus of the deficit model is on developing teachers with identified weaknesses. According to Reddy (2004), the deficit model concentrates on understanding the teachers that lack the necessary skills for developing confidence. This means designing and implementing training programmes for those teachers who display deficiencies in their profession in order to help them enhance their capabilities (Reddy, 2004). The deficit model is therefore designed to amend teachers' weaknesses through correctly addressing their shortcomings (Kennedy, 2014). However, this model might be ineffective for some teachers because it supposes that experts are more aware of how teachers should work in their workplace than the teachers themselves are (Reddy, 2004).

3.3.4 The Cascade Model

The cascade model involves configurations in which teachers who present programmes for PD then transmit skills and knowledge acquired throughout the training programmes to their colleagues at work (Kennedy, 2014). This model is cost-efficient because a small number of teachers attend training programmes. Hence, it is a useful model when having a big number of teachers with restricted resources and within a short time (Reddy, 2004). One of the drawbacks of this model, however, is that it rarely focuses on values and what is passed on in the cascading process is generally skills-focused or knowledge-focused (Solomon and Tresman, 1999).

3.3.5 The Standards-based model

The standards-based model highlights conformity with the standards placed by the Ministry or authority for PD (Kennedy, 2014). Hence, it narrows down the notion of instruction to the gaining of a standardised group of knowledge, skills and values which is one of its main weaknesses (Kennedy, 2014). The standard-based model has a relative affinity to the transmission-based model linked to its method of delivery, its assurances on competence and the limitation of autonomy it provides to teachers. This model has been criticised for underestimating the complication of education and individual teacher's innovation and contribution to the process of learning (Kennedy, 2014). Despite these limitations, Kennedy (2014) indicated the potential for standards to scaffold PD and enhance greater dialogue between teachers. Understanding the aspects of this model is important for this study as Standards for Teachers were introduced in KSA in 2020 at the time of writing this research.

3.3.6 The Coaching or Mentoring Model

The coaching or mentoring model is a strategy of PD that delivers one-on-one development opportunities for teachers focused on enhancing learning by reflecting teacher to another teacher in practice (Loucks-Horsley, 2010). The processes of coaching and mentoring share some features but coaching usually takes short-term while mentoring takes long-term (Kennedy, 2014). This model is a strong strategy that contributes to improving teachers' knowledge and skills. It gives benefits to new teachers because they learn from experienced teachers (Loucks-Horsley, 2010). Nevertheless, the lack of well-trained coaches and the short-term impact of mentoring may be among the limitations of this model which Forde (2011) identified.

3.3.7 The Community of Practice Model

The community of practice model normally comprises of a set of teachers or colleagues training as a unit to advance their classroom practices (Kennedy, 2014). According to Wenger (2011), 'communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly'. There are diverse names for communities of practice in different organisations, such as 'thematic groups', 'learning networks', or 'teach clubs' (Wenger, 2011). In this model, the entrants' awareness of the aims and objectives of this community is central to the learning.

Furthermore, the model focuses on shaping the development and new learning as an outcome of the interaction of group members of the community. Depending on the role played by the dominant team members, learning could tend towards transmission-based or transformative-based learning (Kennedy, 2014).

3.3.8 The Action Research Model

The action research model is one of the models which provides teachers with autonomy (Sachs, 2003). According to Sagor (2000, p. 3), '[a]ction research is a disciplined process of inquiry conducted by and for those taking the action. The primary reason for engaging in action research is to assist the "actor" in improving and/or refining his or her actions'. In this model, teachers play the major role in changing their practice actively (Carl, 2009). Loucks-Horsley (2010) argued that action research is a powerful strategy for PL that is designed to enable teachers to attain four outcomes: increasing teachers' knowledge, promoting quality teaching, improving leadership capability, and creating communities of PL. Kennedy (2014) indicated that this model has a considerable potential for professional autonomy and transformative practice. However, the extent teachers could be critical of the main political determinants which influence their practice may be questioned (Sachs, 2003).

3.3.9 The Transformative Model

The transformative model comprises of the integration of several processes and conditions from some particular existing models such as the transmission-based and translation-based models (Kennedy, 2014). This model supports educational change (Hoban, 2002). Its characteristic of enabling integration of two or more models makes it a relatively strong model (Kennedy, 2014).

It is important to note that the PD models examined in this section offer some insights into the prevailing practice in the field of education globally. Specific to the Saudi context, the traditional method of the training model has been endorsed by the General Administration of Training under the Saudi MoE (Al-Sultan, 2006; Saylor, 2014; Jacob and McGovern, 2015). However, as discussed in the previous chapter, with the aim of enhancing the quality of teaching and building up the skills of the teaching workforce particularly as education reforms are carried out, the MoE in KSA has introduced some measures including the introduction of teacher standards and the adoption of a number of new strategies or models including LS which draws on the characteristics of Kennedy's (2014) transformative PD

models. To better understand the significance of PD and its effectiveness, the next section will discuss the importance of PD in detail based on the literature.

3.4 The Importance of Professional Development

There has been an increasing amount of research interest concerning the importance of PD (Birman, et al., 2000; Sparks, 2002). Researchers and policy makers have found that to improve learning environments, and thus learning outcomes, increasing the quality of teachers is necessary, if perhaps not sufficient (Guskey 2000; Feiman-Nemser 2001; Elmore, 2004; Fullan 2007). Thus, any plan for educational reform should include supported and continued PL in order to obtain the desired results.

There has been an increasing amount of research into the effectiveness of different PD strategies (Penuel et al., 2007; Frechtling et al., 1995; Fishman et al., 2003). For example, Kryvonis (2013) reported that it is important that CPD in The United States of America (hereafter, USA) should focus on teacher-led learning, that is, learning programmes which teachers are responsible for designing, rather than ‘deficit-based’ PD which mean learning programmes in which teachers are mere recipients.

One of the most important studies about the effectiveness of PD found that successful PD contains two significant elements: ‘structural’ and ‘core’ (Garet et al., 2001). The study shows that the structural components are those that supply context for PD such as duration, form, and collective participation. On the other hand, the core features are those that characterize the operation of a PD experience. These focus on content, active learning, and coherence.

Moreover, researchers, educators, organisations and associations have created lists of characteristics of effective PD (Guskey, 2003). Such reviews by researchers have identified 12 types of characteristics from different groups. Guskey (2003) presented 21 characteristics which define the most important characteristics that determine the effectiveness of PD. The following are examples of the identified characteristics of effective PD:

- Enhances teachers’ content and pedagogic knowledge;
- Provides sufficient time and other resources;
- Promotes collegiality and collaboration;
- Improves procedures for evaluation;
- Increases alignment with other reform initiatives;

- Models high quality instruction;
- Based on-site where teaching occurs;
- Builds leadership capacity;
- Based on teachers' identified needs;
- Driven by analyses of student learning data;
- Focuses on individual and organizational improvement;
- Provides follow-up and support;
- Is ongoing and job-embedded;
- Based on best-available research evidence;
- Takes a variety of forms;
- Provides opportunities for theoretical understanding;
- Helps accommodate diversity and promote equity;
- Driven by an image of effective teaching and learning;
- Provides for different phases of change;
- Promotes continuous inquiry and reflection; and
- Involves families and other stakeholders.

Compared to the above-mentioned characteristics, the provision of PD in Saudi Arabia is neither sustained nor coherent (Alharbi, 2011). As previously indicated in Chapter 2, so far, only a few principles of effective PD elements seem to have been adopted to facilitate teachers' engagement in PD in Saudi Arabia. The reality is that PD in Saudi Arabia is designed nationally and delivered through LEAs. This means that there is a conspicuous absence of the voice of "others". It is best described as a one-size-fits-all model which may not be appropriate for many teachers. There is therefore room for improvement if KSA is to meet its Vision 2030 targets.

3.5 Professional Development and the Theory of Action

Regional Educational Laboratory Southwest (2016) indicated that over time, the focus on the significance of PD for teachers has continued to grow from strength to strength. However, developing strategies which enhance teacher practice and impact student learning has been a challenge. Therefore, the theory of action (hereafter, ToA) has been proposed as an alternative to the existing approaches to PD supported by research as its supporters argue:

Professional development affects student achievement through three steps. First, professional development enhances teacher knowledge and skills. Second, better knowledge and skills improve classroom teaching. Third, improved teaching raises student achievement. Therefore, if one link is weak or missing, better student learning cannot be expected. If a teacher fails to apply new ideas from professional learning to classroom instruction, for instance, students will not benefit from the teacher's PD (Regional Educational Laboratory Southwest, 2016).

As suggested by this view, ToA assumes a 'cause and effect' kind of relationship between teachers' CK and PCK on the one hand, and student outcomes on the other. Although PD is not often cited in the existing literature as a ToA, there is overwhelming support both in research and in practice that PD is much of a ToA, and not merely an activity (Ball and Forzani, 2009; Barth and Rieckmann, 2012; Darling-Hammond and Baratz-Snowden, 2007; Guskey and Sparks, 2002). Essentially, PD as a ToA provides teachers with opportunities to engage in the kinds of learning that can and must inform their teaching (Barth et al., 2005). As a result, this view of PD provides an appropriate platform where teachers can incorporate what they learn when engaging in PD activities into their teaching practice (DuFour and Eaker, 1999). For instance, if a teacher is able to make predictions of students' outcomes based on observations and analysis, then a clear understanding of the cause-and-effect relationship between teaching and learning will emerge.

Specific to LS, the ToA has the following advantages including enhancement in the general knowledge of participants (CK), participants become more skilful in their teaching (PCK), and a general improvement in student learning (Dudley, 2012). It is worth emphasising that the essence of any PD programme including LS is to help improve teacher and student outcomes. However, different researchers have relied on several different factors in honing their conceptual understanding of PD. In this study, the ToA as described by Desimone (2009) provides the conceptual framework and is used to guide this research. Desimone (2009) has identified four main steps in developing a theory of action for PD:

- Teachers experience effective PD.
- The PD increases their knowledge and skills and/or changes their attitudes and beliefs.
- They use their knowledge and skills, attitudes and beliefs to improve the content of their instruction or their approach to pedagogy (or both).
- The new instructional practices result in increased student learning.

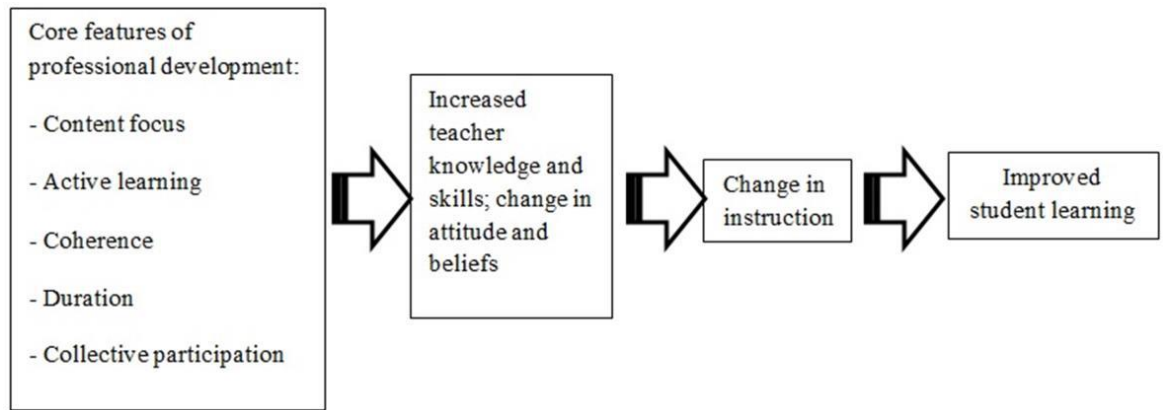


Figure 3-1 “A theory of action” for teachers’ PD (adapted from Desimone, 2009, p. 185)

3.6 Professional Development and Student Achievement

The relationship between PD, learners’ achievements and the way that teachers learn to increase their skills has become an important point of focus for researchers (Garet et al., 2001; Guskey, 2000; Penuel et al., 2007). It was argued that the best way to increase pupils’ outcomes is through teachers’ development. This is relevant because in the 21st century, pupils need high quality learning in order to develop higher thinking skills. Therefore, teachers need to improve their skills to address learners’ needs (Silva, 2008). Since the 1990s, there has been expansion in educational research that evaluates the impact of PL on pupils’ achievement. Kennedy (1998) reviewed the link between the effective PD and student achievement. Kennedy (1998, p. 17) indicated that:

programmes whose content focused mainly on teachers’ behaviours demonstrated smaller influences on student learning than did programmes whose content focused on teachers’ knowledge of the subject, on the curriculum, or on how students learn the subject.

PD leads to major gains in students’ achievement in three steps, according to Yoon, et al., (2008). The first step is that the PD advances knowledge and skills of teachers. The second step is that knowledge and skills will improve the learning environment. The third step is that improved classroom teaching will lead to improved student achievement (Yoon et al., 2008). It is important to point that how plausible this three-step model of PD can be depends on how broadly or narrowly ‘knowledge and skill of teachers’ is read. It is possible to argue that Yoon et al.’s (2008) model missed out professional dispositions, but the possession of relevant skills may well presuppose, or necessitate the possession of appropriate dispositions.

In Standards for Professional Learning, (Learning Forward, 2011) it was suggested that there is a direct relationship between standards-based PD and enhanced student success as well as between standards-based PD and improved value of instruction. If PD is based on standards, they argued, it is more likely to change teachers' beliefs and what they know and can do. Furthermore, Learning Forward (2011) indicated that teachers will have a wider range of strategies to use with students when their skills, knowledge, and dispositions change. In at least one sense, there appears to be a degree of plausibility in this claim as learning new strategies requires change, learning new strategies increases a teacher's pedagogical options and having more pedagogical options will benefit teachers and help students improve their learning.

Another way in which Learning Forward suggests the relationship works is in a cyclical fashion as presented in Figure 3.2 below:

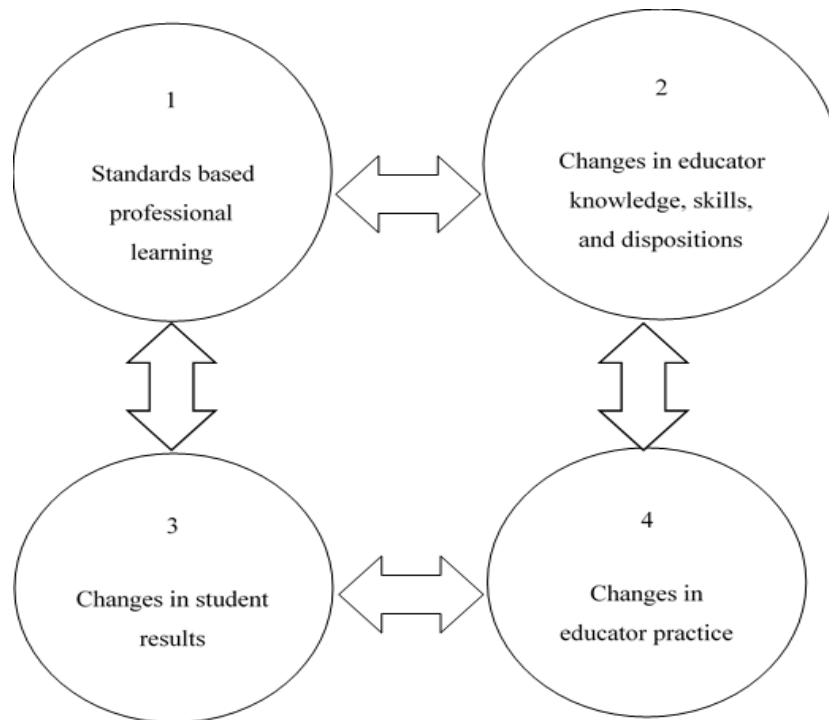


Figure 3-2 Learning cycle: Adopted from Learning Forward, (2011, p. 29).

The cycle of continuous improvement is supposed to work in two ways. When teachers do not obtain the desirable results, they may define their needs, decide the changes they need to make in their practice and then define the skills, knowledge and disposition they need to adapt their practice. Based on the outcome, teachers decide how to apply the standard to enhance their practice (Learning Forward, 2011).

3.7 Chapter Summary

This chapter provides an in-depth literature review of PD. After defining PD and exploring the relationship between PD and PL, different models of PD are examined mainly based on Villegas-Reimers (2003), Liberman (1996) and Kennedy's (2014) frameworks. It has been shown how LS as a PD strategy is positioned within the three frameworks. The chapter then investigates the significance of PD showing the link between effective PD and student achievement. Finally, the chapter indicates that ToA will be used to guide the study because of the advantages it offers such as developing teachers' knowledge, classroom practice and student achievements. The next chapter will discuss lesson study in detail based on the national and international literature.

Chapter 4 Lesson Study (LS)

In this chapter, a literature review of LS as a strategy for supporting teacher development is provided to gain deeper understanding of LS. The chapter will conceptualise LS as an international model of PL based on the insights obtained from the literature. The origin of LS, its perceived benefits, the LS process and challenges of implementation are critically discussed. In addition, case studies on LS from the international context are examined with a particular focus on comparing the Japanese and Saudi contexts. An analysis of teachers' construction of PK, the value of LS in constructing teachers' PK and constructing collaborative norms will follow at the end.

4.1 Meaning and Origins of LS

Warwick et al., (2016) and Hourigan and Leavy (2021) suggested that LS has become one of the most popular models used for PL for teachers all over the world. Many authors pointed out that LS originally started in Japan over a century ago as a teacher PD model which was (and still is), a school-based strategy, which enables teachers to collaborate more effectively than other frameworks (Stigler and Hiebert, 1999; Yoshida, 2002; Lewis, et al., 2009; Arani, et al., 2010; Makinae, 2010; Murata, 2011). It is further claimed that LS is similar to air to modern Japanese teachers because it is embedded in their daily school life (Fujii, 2016).

In terms of origin, LS is traceable to the Japanese phrase “jugyo kenkyu”, which means ‘the study of lesson’ (Makinae, 2010). LS has enormous significance in Japanese history and often linked to the period when Japan was ruled by Emperor Meiji-tennō, from 1868 to 1912. During this period, Japan introduced the Western school system and an American teacher, Marion Scott, introduced what is now considered to be the classroom teaching method which was widely used in America, at the time (Ishii, 2017). This became a new style of teaching in Japan whereby a teacher teaches a class of pupils whilst they are seated using a “blackboard or teaching charts and object lessons” (Makinae, 2010). In order to promote this approach, teacher training became fundamental in Japan using the concept ‘object lesson’.

The concept of ‘object lesson’ is based on a theory propounded by Johann Heinrich Pestalozzi, which essentially argues that teaching should begin from observing objects, and that such help learners to understand concepts through their own intuition (Shimizu, 2014).

Although this was only popular in America at the time, pre-service teachers in the majority of schools elsewhere, particularly in Japan began practicing the use of ‘object lessons’ by using what is referred to as ‘the criticism lesson’. The criticism lesson requires that each school student will show a lesson to their group, then the class is expected to observe this lesson, and then give feedback on various aspects of the lesson (Shimizu, 2014).

In 1888, the University of Tokyo invited Emil Hausknecht, who was a German professor in education, for the purpose of disseminating modernisation teaching. Akita and Sakamoto, (2015, p.25) suggested that the aim of his visit was to “introduce and spread the modernised method to public schools all over Japan, and encourage LS”. This implies that LS might have been introduced by early teaching methods which had already been established, in either/both Germany and America. However, LS was still in its infancy and had not matured into the model other countries wanted to adopt to train their teachers (Isoda, 2010). Similarly, Fernandez and Chokshi (2002) reflect this view, by pointing out that Japanese teachers use this approach systematically, as it aims to aid teachers to improve their work practices, and successes in this have resulted in other countries adopting (a variation) of this Japanese practice.

Loucks-Horsley et al., (2010) found that the conventional Japanese system of LS was considered to be a useful tool for developing teachers through ‘learning in action’, which is a style of experiential learning formulated by Kolb in 1985. He suggested that this is an effective approach used to teach and learn, and that it is based on the idea that individuals learn best through experience (Kolb, 2014).

4.2 Characteristics of LS

Lewis (2000, pp. 4-6) pointed out that Japanese LS research lessons generally share five special characteristics, which differentiate them from other types of teacher PD. She suggested that:

- LSs are “observed by other teachers”. Observing teachers can sometimes be representatives of other schools, although it is mostly teachers who work at the same institution.

- LSs are “planned for a long time, usually collaboratively”. This enables LS to extend over a period of time, which also enables educators to collaborate to develop the research lesson.
- LSs are designed to bring to life in a lesson a particular goal or vision of education.
- LSs are recorded. “This recording is completed in several ways, including video recording, observational notes, and examples of student work”.
- LSs are discussed – that is, during the debriefing step and teachers often continue to discuss and reflect following the research lesson.

However, this model bears similarities to other frameworks of LS, as for example, described below by Shuilleabhain (2015a), and Yoshida (2002) which have been embraced in other countries. This suggests that the Japanese approach to LS is not as unique now as it may once have been, although it is widely accepted that the Japanese are the most successful at utilizing this tool. One reason may be the Japanese cultural attitudes towards LS that may be hard to replicate by other countries.

The majority of Japanese elementary school teachers use LS as a PL model, often ranging from once a month (after school, and work on a specific subject; or theme) to several times a year (Arani et al., 2010). Although, some research schools are specifically funded to deliver LS groups to explore new teaching methods, these lessons are conducted publicly during afternoons, to make it easy for other experts, teachers, bodies, trades unions or sponsors to attend.

Japanese teachers have many opportunities to participate in LS. Lewis and Takahashi (2013) pointed out that there four types of diverse providers of LS in Japan: local schools, district schools, university attached laboratory schools, and professional associations. However, universities are often responsible for providing special training programmes about LS as ‘pre-service teacher-training programmes’, as well as LS groups for in-service teachers (Shimizu, 2002).

Wood and Cajkler (2017) indicated that LS is a PL method that is based on collaboration amongst teachers in order to improve their professional learning and student learning. However, the literature shows that a number of different terms have been used interchangeably to refer to LS. For example, Hargreaves (2012) used ‘joint PD’ instead of

‘continuous professional development’, whilst others argued that LS is a ‘professional development process’ or a tool for ‘professional growth’ (Rock and Wilson, 2005; Education Scotland, 2015). Furthermore, according to Education Scotland (2015), LS is a consultation and planning process, where teachers analyse the interaction in the learning environment, content and connection between topics, the way in which resources are employed, and the manner in which the curriculum is developed.

Many scholars argue that LS is distinct from other teacher development models because it concentrates on the learning (not on the teacher), on observing pupils’ learning (as opposed to the teachers’ performance), on the collective work of the teachers, instead of an individual teacher’s performance, (Stigler and Hiebert, 1999; Yoshida, 2002; Rock and Wilson, 2005; Stepanek et al., 2007).

This view was also reinforced by the Third International Mathematics and Science Study (TIMSS), where Stigler and Hiebert (1999) concluded that (at that time) existing teaching practices needed to be modified in the United States if pupils were to be sufficiently ready to meet the challenges of the twenty-first century. Along a similar line, at that time Darling-Hammond and McLaughlin (2011) suggested that PD for teachers was based on out of date, traditional methods, in which teachers had a passive role, where they were given information from trainers, and were given few chances to share their ideas, experiences, and understanding about the learning environment. Rock and Wilson (2005) went further and highlighted that a host of actors led campaigns for school reform (such as Linda Darling-Hammond, Ann Lieberman, and Milbrey McLaughlin), as they identified an urgent need to reform measures for teacher development. This point is also reflected by Bartalo (2012) who claimed that American teachers used methods that had severe limitations. Therefore, Bartalo (2012) suggested that teachers needed to employ techniques which facilitated learning more about teaching, utilising expansive teaching methods such as how pupils solve problems, ask questions, explain concepts, and set up learning experiences.

Stigler and Hiebert (1999a) argued that change during this period could only be enforced using a different approach to conventional methods used to prepare and support teachers. In *The Teaching Gap*, Stigler and Hiebert (1999b) identified LS as the preferred PD strategy for educators. Wood and Cajkler (2017) indicated that following this publication, many countries (Singapore, China, Hong Kong, Indonesia, UK, Sweden, Norway, Spain and the

US) adopted this model (or a variation of it) based on the envisaged benefits of LS (the models these countries adopted will be explored in more detail below).

In view of all that has been mentioned so far, it could be argued that Stigler and Hiebert’s publication of *The Teaching Gap* was a pivotal point which inspired many education systems throughout the world to revise the way in which they professionally developed teachers. In addition to this, one might imply that LS is a path to teacher PD that varies clearly from the PD models common in other countries. Liptak (2005) contrasted LS with traditional PD as practised in the United States, as shown in Table 4.1 below.

Traditional professional development	Lesson Study
Begins with answer	Begins with question
Driven by outside “expert”	Driven by participants
Communication flow: trainer to teachers	Communication flow: among teachers
Hierarchical relations between trainer and teachers	Reciprocal relations among learners
Research informs practice	Practice is research

Table 4-1 Comparing Views of Professional Development (Liptak, 2005).

Following from the table above, the difference between LS and other professional development models is shown in relation to all aspects of the models. The evidence presented in this section suggests that LS provides teachers with more opportunities for developing their own knowledge and teaching skills, gaining new insights, promoting collaboration among teachers and sharing ideas with the LS group (Sagor, 2000; Donaldson, 2010).

It is important to point out that there have been different adaptations of the Japanese LS model around the world, aiming at focusing on particular core elements of the original model that best fit into their educational system and objectives (Yoshida, 2012). However, the reason behind the adaptations could be due to the difficulties that different countries faced when they were not able to assimilate the Japanese cultural behaviours towards LS (Fuji, 2014; Hourigan and Leavy, 2021). Although many countries recognise the benefits of the Japanese style, they may not be able to successfully replicate it in their contexts or get the results or support needed as in Japan. For example, Hourigan and Leavy (2021) indicated

that the quality of support available for the LS group could affect the success of employing this model outside Japan. Fujii (2014), highlighted that this lack of success could be due to four attributes. He argued that when other countries try to employ the Japanese model, they are considered to be inappropriate as, firstly, they often observe lessons and debrief the lessons without asking any questions in an entire process. Secondly, teachers in some countries often follow lesson plans without using evidence of students' learning in the class. Thirdly, instead of teaching using problem-solving techniques, some teachers may rely on a 'structured problem-solving' approach which places a focus on debriefing on the teacher instead of the teaching.

In summary, the countries mentioned previously used LS as a PL model after Stigler and Hiebert (1999) published *The Teaching Gap*. Since this publication LS has experienced phenomenal growth globally as it has been embraced by educators around the globe. In addition to this, many actors highlight the noticeable positive differences that LS has made (as mentioned by some of the commentators from different countries in the section below).

4.3 Significance of LS

The significance of LS to teachers and the entire education system cannot be overemphasised. For instance, LS through its continuous professional development style makes teachers develop into better educators (Cordingley et al., 2004; Hourigan and Leavy, 2021; Jhang, 2020). Cordingley et al., (2004) argued that LS is essential for teachers, as it combines all the attributes of PL that most improve teaching and learning. For example, PL is not a stand-alone event, learning takes place over time, it happens in a 'real' situation with real students in a classroom, and it involves a degree of combined experiment or enquiry between educators who are aiming to improve an approach or tackle a problem collaboratively.

Duncombe and Armour (2004) defined collaboration in PL as any opportunity where teachers work together to develop their own or others' understanding of any educational or instructional issues. This includes activities such as working on tasks together, observation, sharing ideas or discussing the implementation of resources. Furthermore, collaboration is a key feature of LS as it enables teachers to brainstorm, interact, engage, and discuss diverse

methods, which can improve the outcomes of a LS, and student learning (this concept will be explored in more detail below).

According to Dudley (2014a), LS is a style of ‘school action research’, which lends itself to improving the teachers’ practical knowledge. The action research model is described as a tool which enables teachers to be more autonomous (Sachs, 2003). According to Sagor (2000, p.3), “action research is a disciplined process of inquiry conducted by and for those taking the action. The primary reason for engaging in action research is to assist the ‘actor’ in improving and/or refining his or her actions”. In addition to this, Loucks-Horsley et al., (2010) argued that action research is a powerful strategy for professional learning that is designed to enable teachers to increase their knowledge, promote quality teaching, improve leadership capability, and create communities of professional learning.

National Research Council (2000) identified the essential features of inquiry, in which learners are drawn by its scientifically oriented questions and answers, are prioritized over evidence (which enables them to devise and explore explanations that address those questions), can form explanations from practical evidence, are able to evaluate explanations (in consideration of alternatives) and can communicate and defend their explanations. Similarly, Dudley (2014a) suggested that LS is a powerful approach to professional learning as it helps teachers to reap the following benefits:

- 1) Focus more on the individual needs of the learners.
- 2) Distinguish between theory and practice, and in doing, teachers can gain a better understanding of the learning process.
- 3) Identify the best possible learning plan suited to students.
- 4) Work in a learning community which is committed to helping students to learn, and to the PL of the members of the teachers in the group.
- 5) Improve their instruction.

In the same vein, Wood and Cajkler (2017) have noted that LS assists teachers to identify learning challenges that are related to specified area of action such as a particular skill or field of subject content. Thus, LS is seen to be more focused on the student learning experience and classroom needs more than developing the knowledge and skills for individual teachers.

Studies which have analysed LS in different educational contexts give the impression that it is a powerful aid which can enhance the PL for teachers. One such study is that of Xu and Pedder (2015) where they reviewed 67 articles published between 2002 and 2013. Of those articles 23 were from the USA, two were from Canada, six were from Hong Kong, six were from Singapore, five were from the UK, four were from China, three were from Japan, two were from Indonesia and two were from South Africa, and one each from Israel; Malaysia; Australia; Vietnam; Brunei; Turkey; Spain; Sweden; and Ireland. They concluded that majority of these studies indicated that LS had a positive impact in relation to:

- Teacher development and collaboration of a PL community.
- Growth of professional knowledge, practice and professionalism.
- Impact on the students' learning.
- The quality of classroom instruction and learning.

However, it is clear that this study was heavily focused on LS practices in the US, given that over a third were based in American schools.

In Seleznyov's (2019) study, the findings from her systematic review of the international literature on LS explored studies published between 2006 and 2016. The aim was to analyse the existing evidence of the impact of LS on students, teachers and schools based on Guskey's (2000) five levels for the evaluation of PD. The findings demonstrated that out of the 56 studies, 45 (80%) showed positive changes in teachers' PL in at least one or more of the following areas: subject knowledge, PCK, and teacher confidence. Further, 33 of 56 studies (59%) identified evidence of teachers changing their practice in response to their involvement in LS. However, only 18 of the 56 studies (32%) demonstrated evidence of a positive impact on student learning in relation to attitudes and/or progress. The study provided little evidence of LS making a difference to teaching, the schools' PL cultures and structures.

Lewis and Perry (2017) also conducted a study which consisted of a randomized trial with 1162 pupils and 231 teachers in 39 naturally occurring teams from across the US. The research participants were using LS to improve the teaching and learning of fractions over a six-month period; and post-tests were administered at the end of the intervention, using fraction items from USA national and state tests. Specifically, the teacher groups were

randomly assigned into one of three groups: the experimental group, control group, and a group who were given the LS support materials. The research findings suggested that the LS intervention had a significant impact on teachers' and pupils' fractions knowledge, after controlling for relevant variables, and that teachers participating in LS reported a significantly higher quality of PL than the control groups.

4.4 Stages in the LS process

Yoshida (2002) argued that there are three stages in the LS process: recognising a long-term goal or subject, teaching a research lesson in order to explore the goal, and reflecting on the steps taken. The first stage is concerned with identifying an appropriate topic. It begins with determining the gaps between the level of the learning experience for pupils, and the desired level teachers want the students to achieve (Lewis, 2002b; Watanabe, 2002). The second stage is completed by a group of teachers who meet to plan and discuss how they aim to teach the lesson. During a lesson one of the teachers educates and leads the research lesson, whilst other teachers observe it. Finally, in the last stage, all the teachers will participate in the feedback and reflection process, not on the teachers' performance during the research lesson (Stigler and Hiebert, 1999; Yoshida, 2002; Puchner and Taylor, 2006; Stepanek, et al., 2007).

However, these three stages outlined by Yoshida (2002) above are subdivided in several ways ranging from four to eight steps depending on the context. For example, Stepanek et al., (2007) divided this process into five steps. Firstly, setting a goal which is focused on the students to help them to become more confident, creative and innovative. From this goal, a theme is developed to address important issues which will have an impact on their learning. Secondly, to plan the lesson. Using the theme of the research the LS team jointly devise lesson goals from examining information or from identifying a common concern. Thirdly, teaching, observing, and debriefing. After completing the plan, a teacher will deliver the lesson, whilst the others collect data (sometimes with a guest referred to as a 'knowledgeable other') to collect data to analyse how effective the lesson is, and this is followed by a 'debriefing', where observations are discussed. Fourthly, revising and re-teaching. In this step, changes are made based on the previous step. This process is completed when the team reflect and share the results. The team will conclude the process by publishing a report

detailing the work undertaken during the process, and aims to inform future LS cycles, and associated PD endeavors.

Along a similar line, a report written for the University College of Dublin by Shuilleabhain (2015b), with support from the National Council for Curriculum and Assessment divided LS into five steps: formulate goals and curriculum, plan a chosen or revised research lesson, conduct and observe a research lesson, reflect on the research lesson, and re-teaching a research lesson (see Figure 4.1). This was designed to serve as an introductory guide for teachers.

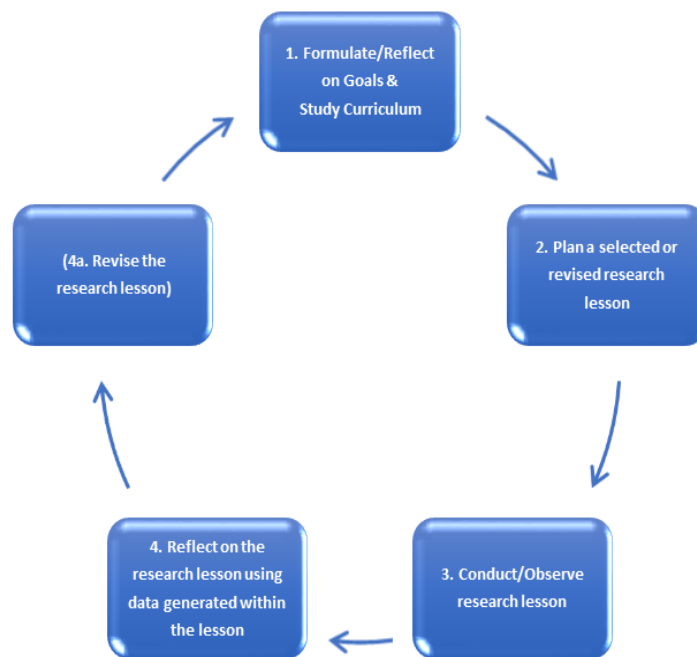


Figure 4-1 LS Cycle, adapted from Shuilleabhain (2015, p.7).

It is important to mention that the study has adopted the stages of LS illustrated above in line with Shuilleabhain (2015). The next subsections will discuss the stages of LS in detail.

4.4.1 Form a LS Group

Lewis (2002) suggested that it is important to establish a LS group as the first step of the LS process. Dudley (2014) suggested that in the UK, groups are selected from teachers who like the challenges of establishing a new school-based PL system. In addition to this Kolb (2015, p.37) pointed out that LS groups often come from the same grade level or discipline. According to Stepanek et al., (2007), this step works best if it includes between three to six teachers who are prepared to work collectively to improve classroom practices. However, it must also be pointed out that a LS group which has more than six teachers could struggle to meet collectively at an allocated time, on a regular basis, due to other teaching commitments. Additionally, having a LS group with less than three teachers is highly unlikely to represent a PL ‘community’ because of the lack of diversity and representation from a broader range of professional backgrounds including age, gender and experience. In addition to this, if one of the three teachers is taking the class, this would mean that the group is primarily represented on data presented on the remaining two teachers, which is even less representative of what may be deemed to be a ‘professional community’. Although a group of six teachers may hardly be considered to be a significantly higher number, it is considered to be appropriate to be able to inform a community of professionals of what has occurred during a LS.

4.4.2 Setting a Research Lesson Goal/or Choosing a Topic

This step enables teachers to choose a topic or a goal which is designed to promote their professional learning, and pupils’ learning. The group goals are defined for both the unit and the research lesson, and not only include content and process goals, but also those which relate to the long-term LS goals (Burghes and Robinson, 2010). In this step, teachers often choose a topic which is challenging, yet rewarding for the students or a topic with a new syllabus (Lewis, 2002; Cerbin and Kopp, 2006). After choosing the subject area, teachers set goals which help the teachers to measure the students’ progress, and their own development (Fernandez and Chokshi, 2002). During this step, teachers may be considered to be adult learners who are developing as teachers whilst teaching subject areas which interest them as educators.

4.4.3 Plan a Research Lesson

In this step teachers collaboratively plan a research lesson. It may be considered important to note that this step takes up most of the teachers' time in Japan, and therefore may be considered the most important step (Lewis, 2002). Here, the group will gather research on their subject, utilizing all available resources on the topic at their disposal (such as, textbooks, or seeking advice from specialists in universities, and schools), whilst also planning the time taken for the LS process (Fernandez and Chokshi, 2002). Matthews et al., (2009) also stated that that when teachers work collectively as a group during this stage, that this often promotes their collegiality and collaboration. Figure 4.2 below provides an example of a research lesson planning sheet.

Research lesson planning, observation and discussion sheet Subject, Learning Focus Teacher/observer							
Precisely what is this research lesson aiming to teach? (it may be a section of a longer teaching sequence) <i>By the end of this lesson pupils will be able to and we will know this when ...</i>							
What learning or teaching technique is the research lesson aiming to develop? <i>We are hoping to improve...</i>							
Current attainment and success criteria Describe what you are looking for from them by end of lesson in the identified aspect	Case pupil A Success criterion for this focus		Case pupil B Success criterion for this focus		Case pupil C Success criterion for this focus		
Stage of lesson sequence	How you predict case pupil(s) A will respond	<i>How they are observed to respond</i>	How you predict case pupil(s) B will respond	<i>How they are observed to respond</i>	How you predict case pupil(s) C will respond	<i>How they are observed to respond</i>	Patterns / issues
Stage ... (approximate time)							
Stage ... (approximate time)							
Final stage ... (approximate time)							
What were they able to do? (What progress have they made and how do you know?)							
Initial thoughts							

Figure 4-2 Adapted from Dudley (2014)

The concepts of collegiality and collaboration seem to be entwined with one another as Saito (2012) highlighted 'collaboration' as one of the most important foundations of LS for collaborative learning amongst students, learners and teachers, and amongst teachers. He pointed out that collaborative learning is only possible through a process which begins with listening. Lim et al., (2005) argued that collaborative learning improves collegiality amongst teachers. Many scholars reinforce this view including Lewis et al., (2004) and Lee and Oyao (2013). The scholars pointed out that LS can build communities of practice (which enables teachers to share resources and ideas), and by jointly planning, observing, analysing, and reflecting on learning in real-time teachers could learn from one another. With that in mind, Saito (2012) agreed with the view that collegiality is embedded in teaching practices through a collaboration of 'design and reflection' of learning.

Social constructivism is the theoretical model for building collegiality amongst teachers. This framework stresses that knowledge is created in response to social interactions. Rock and Wilson (2005) argued that teachers should encourage activities that facilitate a verbally interactive environment and require that teachers communicate frequently with novices and experts in respective fields of study. Similarly, DuFresne (2008) indicated that for a long period, teachers have worked in an isolated environment, with little opportunity to collaborate and/or observe other teachers, highlighting the importance of collegiality when developing teachers professionally.

For these reasons mentioned, it would seem that this step in particular enables teachers to feel less isolated when teaching, through a collaborative PL process. Isolation is considered a problem within teaching environments which actors from various countries identify as being a key concern with traditional PD practices (as highlighted in the case of Saudi Arabia below). In this context, it could further be suggested that this phase of LS facilitates for a sense of cohesion, enhances the reorganisation of teachers, and allows them to share ideas regarding the use of effective instructional methods in the classroom.

4.4.4 Teach and Observe a Research Lesson

After developing the research lesson, the teacher facilitating the class will deliver the lesson, whilst the other teachers who make up the study group observe. This will occur simultaneously enabling the study group to analyse student responses and attitudes during the research lesson and look for evidence of what students may be thinking, and what the class may be engaging in or motivated by (Watanabe, 2002; Fernandez and Chokshi, 2002). This also allows teachers to walk around the class and collect various data, concerning student social attitudes, and behaviours during the research lesson (Stigler and Hiebert, 1999). Scholars recommend that the observers concentrate on the research lesson or student learning experience, but not on the teacher teaching the lesson, which is what some teachers do (Stigler and Hiebert, 1999; Stepanek, et al., 2007).

It could be argued that this process is heavily reliant on the teachers' observations, and this skill should be developed more during the LS process. In the context of the Saudi education system, most of the teachers rarely use observation as Abdulkareem (2009) suggested. Therefore, Abdulkareem (2009) suggested that Saudi teachers need to improve their observation skills. Watanabe (2002) suggested that it is important to create a comfortable environment for teachers to work together and build observation skills during the LS process. In addition to this, Dudley (2014 a) pointed out that during the observation process it is important for teachers to keep records in the blank area provided on the observation forms (see Table 4.2 below). However, it would seem that many of the points in the observation form relate to the teacher and has very little mention of students/student learning.

Observer Questions	Notes
Was the goal clear? Did the supporting activities contribute effectively to achieving the goal?	
Was the flow of the lesson coherent and did it support students' learning of the concept?	
Were the activities and the materials helpful in achieving the goal of the lesson? Did the classroom discussions help promote student understanding? Was the content of the lesson appropriate for students' level of understanding?	
Did students apply their prior knowledge to understand the content of the lesson?	
Did the teacher's questions engage and facilitate student thinking? Were student ideas valued and incorporated into the lesson? Did the lesson summary refer to student theories or ideas? Was the lesson summary consistent with the lesson goal?	
How could the teacher reinforce what the students learned during the lesson?	

Table 4-2: Observation Form. Adapted from Dudley (2014a).

4.4.5 Reflect, Revise and Re-teach a Research Lesson

The final stage involves checking the data collected from the research lesson, reviewing and revising the new information, then to re-teach the revised research lesson. Considering the feedback discussed during this stage, the (revised) lesson is taught to a different group of students by a different teacher in the team. Watanabe (2002) argued that this is a significant stage of the LS which will help teachers deliver the research lesson with repeated success in the future, minimizing any potential foreseeable failures. He suggested that during this step,

group members should have respect and trust for one another because it is one of the important foundations which enables the teachers to share LS experiences with one another.

Joyce and Showers (2002) indicated that this step should begin with the teacher who delivered the research lesson at the start, by explaining what sections of the research lesson went as planned, and what sections that they felt needed to be improved. Following this, the observers discuss and give feedback, and recommendations, with the purpose of enhancing the next research lesson (Joyce and Showers, 2002).

In view of all that has been mentioned so far, there are four significant components for LS. First, collaboration is key in the LS process. Second, lesson planning is a major step during LS as it enables the group to formulate and execute the research lesson. Third, observing the research lesson is fundamental as the pupils' experience cannot be evaluated as effectively by planning a lesson alone or watching videotaped lessons. It is a more hands-on approach, enabling the observers to become part of the learning experience. In theory, this should not have an impact on the 'learning experience' and it will provide the group with a unique insight of how the research lesson is likely to impact the learning experience of future students. However, it must also be noted that there are environmental factors that might be taken into consideration, but cannot be truly accounted for (for example, the culture of the school, the timing of the research lesson, the ability of the learners in the group, the strength of the teacher delivering the lesson). The final component is debriefing which is an important part of LS because it gives an opportunity for team groups to share their experiences, reflect, revise and improve following lessons, based on the experiences of the students.

As indicated above, scholars suggest that LS is a highly effective model which can aid both the inexperienced and experienced to teach and learn. Dudley (2014a), suggested that this is largely due to the closeness of the stages of interaction for the LS group – jointly observing, jointly planning, and jointly analysing, enables the teachers within the group to collectively 'imagine' learning. He argued that this helps teachers understand student learning from other teachers' perspectives in addition to their own. This is followed by the group observing and comparing actual learning, from the research lesson, with the learning that was imagined by the teachers when they planned it. Dudley (2014, p.4), further suggested that this forces teachers to become conscious of things that they may normally not be aware of as the teacher would filter those things out or that they would be managed by the teacher's 'tacit knowledge', which is different to the 'teachers' knowledge' system.

4.5 The Role of the ‘Knowledgeable Other’ in LS

Some studies have shown the important role of the Knowledgeable Other (hereafter, KO) for the success of LS (Chichibu, 2016; Lewiset al., 2006, Takahashi, 2014). The person considered as the KO has the following characteristics: (1) brings new research and curriculum knowledge; (2) shows the connection between theory and practice; and (3) encourages others to think and to learn about teaching and learning (Takahashi 2014). In the USA, the KO tells teachers what to teach rather than serve as a co-researcher (Lewis, 2015). The KO are also sometimes referred to as "Outside Advisors" particularly in the USA. According to Fernandez et al., (2001), the ‘Outside Advisor’ has the three identified purposes which are summarising the discussion about the research lesson, exploring its implications and providing new ideas to the lesson study group.

In Japan, the KO is an external subject or educational specialist invited by the school to observe the study lesson and provide ‘final comments’ during post-lesson discussions (Takahashi, 2014). The KO also engages in planning if possible (Fujii, 2016). In the USA the school also requires the KO to teach public lessons, apart from lessons observations, data collection on student work or reflecting on lessons (Lewis at al., 2006). In Saudi Arabia, according to the guideline of implementing LS, the KO is not an external educational expert, but one of the teachers in the LS group. This individual usually has more experience in the subject area and the educational sector in general. However, the LS process in Saudi Arabia may lose the benefit of outside expertise, which may lead to new or different approaches to problem-solving.

4.6 Challenges of Implementing LS

This section examines the challenges of implementing LS. It could be argued that implementing any model of professional learning is done with some form of challenges or difficulties. Various researchers have identified different issues when attempting to implement LS. Hart et al., (2011), for example, indicated that there are mainly four challenges. First, there is the cost of implementation. LS, like any other PD model, costs money. Often, the majority of teaching staff in a faculty are entwined within the LS community. For this reason, most schools need to hire cover teachers. In addition to this,

schools will seek advice from specialists from universities or professional organizations which also results in additional costs.

The second challenge is related to sustainability. LS is a culturally ingrained and contextually embedded approach towards PL in Japan. However, Hart et al., (2011) pointed out that in countries such as America, PD programmes differ from year-to-year, which could be true of other countries such as the UK, and Saudi Arabia (this will be discussed in more detail below). Hart et al., (2011) suggested that for LS to be effective it needs to be culturally ingrained in the teachers' professional lives, and that this would require a paradigm shift.

The third challenge that Hart et al., (2011) pointed out was the lack of CK from the teachers. This major concern was similarly highlighted by many researchers including Ball (1990), Borko et al., (1992), Hart and Carriere (2011) and Choksi and Fernandez (2004) who argued that it is difficult to implement LS effectively when teachers lack sufficient knowledge (both content and teaching skills). The final challenge Hart et al., (2011) identified, which is a major area for concern in the LS process, is when teachers fail to connect with the students' learning. They suggested that it is important that a powerful link exists between the teachers' LS involvement and their pupils' learning. Ultimately, the effectiveness of any PD programme is evaluated through its impact on the pupils' learning. For this reason, Hart et al., (2011), suggested that schools need a technique for displaying the connection between LS and pupils' learning.

In the same vein, in his study which is based in the US, Yoshida (2012, p.142) identified several challenges when implementing LS over a 12-year period, which included:

- A misunderstanding and/or lack of understanding about LS
- Insufficient support and resources to conduct high-quality LS
- A lack of teachers' content and pedagogical knowledge
- A non-systematic approach to conducting effective LS
- Short-sightedness in planning including the lack of room for 'improvement', and not allocating enough time for PD

The next section will explore variations in LS practices.

4.7 Variations in LS Practices

When adopting LS in countries with different educational cultures and policy contexts impacted by different theoretical traditions, variations in how LS is adopted and adapted can be expected. For instance, Norwich (2018) identified five variations in the LS practices shown below in Table 4.3.

Lesson study (LS)	
Learning study	Hybrid between lesson study and design experiments; differs from the Japanese lesson study model in that research lessons are based on a theoretical framework of learning—namely, phenomenography and variation theory (Kullberg, 2010; Cheung and Wong, 2014)
Collaborative lesson research	Has the following components: a clear research purpose, study of available curricula, written research proposal, live research lesson and discussion, knowledgeable others and sharing of results (Takahashi and McDougal, 2016)
Lesson study for learning community (LSLC)	Teacher development underpinned by social justice commitment. Four key aspects of LSLC practice: changing teachers' perspectives on lessons, teachers' observation approaches, changing relationships between teachers, reconceiving school management strategies, and re-envisioning relationships between schools and local communities (Saito and Atencio, 2014)
Inter-professional lesson study	Enable teachers to adapt teaching for pupils with learning difficulties through inter-professional collaboration between teachers and support professionals (Norwich <i>et al.</i> , 2018)
Micro-teaching lesson study	Uses role play; reflect and debrief and summarise; by group of researchers when developing lesson plans for teaching students with Learning disabilities. First used by researchers to develop lesson plans in research-based interventions and then by group of teachers to become familiar with lesson plans (Regan <i>et al.</i> 2016)
Lesson study for assessment	Switches main focus in the relationship between teaching and assessing in Lesson Study to identify learning needs of specific pupils by trying out different teaching approaches. It involves a typical Lesson Study design, with the review of learning, but uses iterative process to develop pedagogic knowledge about pupil's educational needs (Norwich and Ylonen, 2015)

Table 4-3 Five variations in the LS practices. Norwich (2018).

4.8 Case Studies

4.8.1 The Japanese LS

The concept of LS (“jugyo kenkyu”) was instigated by the creation of the education code by the Education Ministry’s Education Order of 1872, during the Meiji Era (Fernandez and Chokshi, 2002; Isoda, 2007). Education developments were largely made during this time to perpetuate and institutionalise cultural identity in Japan (White, 1987). One of the outcomes of this order was the creation of the comprehensive school system which is what the modern education system in Japan is founded upon (Nemoto, 1999). The concept of LS developed when the Tokyo Normal School and Elementary School were established and affiliated with the University of Tsukuba (Isoda, 2010).

LS was deemed to be very progressive when it started and initially involved the observation of a whole classroom which did not typically take place (Isoda, 2010). In 1873 Normal School published a Teacher’s Canon which stipulated how observations should take place during a LS. In 1883, *Reform the Methods of Teaching*, was the first known LS manual launched in Japan. This text was centred on the Pestalozzian methodology which focused on the use of questioning (“hatsumon”) to develop independent thought. This methodology states that intuition is the basis for all thought; therefore, learning should not start with teaching, but through the observation of an object or concept. From this, guided learning can be built and allows teachers to learn from one other, as well as the formal texts.

4.8.1.1 The Japanese Educational Landscape

The Japanese educational and cultural landscape has admirable features such as hard work and dedication to service which provide the congenial and supportive environment for LS (Lewis, 2002). The Japanese educational and cultural environment is created within teaching that is based on how teachers regard their roles in terms of the academic, social and emotional development of learners (Okano & Tsuchiya, 1999). This has a tremendous influence on lesson development. The work environment in Japan also differs from that of Arabic countries and other jurisdictions. For instance, teachers have desks in a communal space, as opposed to their classrooms, which instantly creates a more collaborative and open community where teachers are more likely to communicate and work together which enhances their development (Okano and Tsuchiya, 1999). Such a shared space can also help

to create a shared culture which is one of the keys to a successful LS (Birman et al.,2000). Observations are routine in Japanese education and constructive feedback is provided in order to facilitate development (Lewis, 1995). All of the above help to create a strong learning community and a school culture that is based on learning and sharing (Watanabe, 2002).

In Japan, there is also a focus on education being about supporting the full development of a child encompassing their social, ethical, emotional, physical, and intellectual development (Lewis, 2002b). This is particularly important in the early years of education and has an impact on how teaching is delivered in Japanese classrooms across all years.

4.8.1.2 Japanese Curriculum

The body that guides teaching and learning in Japan is the National Curriculum and Course of Study (NCCS). The NCCS also focuses on academic, social-emotional and ethical development as well as linking education to daily life (Lewis, 2002a). The National Curriculum in Japan is created by the Education Ministry which also has the responsibility of prescribing which textbooks to be used in schools in order to ensure consistency across the country (Nemoto, 1999). Lessons are therefore based on the prescribed textbooks, but teachers are allowed and encouraged to use other sources as supplementary resources (Archer, 2016). The Course of Study, on the other hand, provides guidance for each content area by setting parameters from within which schools select their materials and develop lessons that are most relevant for their learning community. To ensure that standards are met and that the quality is high enough, any textbooks that are created must receive approval by the Education Ministry in Japan or be published under the Ministry's copyright (Nemoto, 1999). The Japanese system also makes it easy for a direct correlation between textbooks, lesson studies and the National Course of Study to be made (Lewis et al., 2002).

The Japanese curriculum is more sparing than many other nations. For example, in Saudi Arabia, in 8th grade TIMMS science textbooks there are 35 topics whereas in Japan there are only eight topics (Schmidt et al., 1997). Having lesson topics enables teachers to create more in-depth learning.

There are four areas in the National Course of Study that the Japanese Ministry of Education outlines for progression tracking:

- 1) Interest, motives, and attitudes;

- 2) Students' thinking;
- 3) Knowledge and understanding; and
- 4) Skills and procedures (Corey et al., 2010).

The National Course of Study is updated every 10 years which allows for educators to focus on policy development within that cycle (Lewis, 2002b). This is a stark contrast to Saudi Arabia where new programmes are often expected to show results within one to two years.

Lessons in Japan are also influenced by advances in the different content areas. Where this occurs then lessons are initially developed through public research before textbooks are updated or developed. Textbooks are usually created by active teachers meaning that textbook revisions and creations can be as up to date on successful techniques as possible. Furthermore, the curriculum in Japan is focused on delivery, with less time allocated to the selection of materials and how the curriculum is configured (Lewis, 2002b). This is in contrast to Saudi Arabia where teachers spend more of their time selecting content instead of its delivery in the classroom.

The policy for the Saudi educational system is mainly based on the Islamic religious values and the Holy Qur'an. The policy aims to make education more efficient and readily available for the Saudi society in order to develop economically, socially, and religiously. One of its main objectives is to develop an important role in the field of scientific research in order to acquire and apply the global advancement in the different fields of life and the economy. In addition, it aims to train and develop sections of the community to high qualifications in diverse range of disciplines and specializations in order to develop and build their country (Ministry of Education, 2015).

The educational system in Saudi Arabia has three special characteristics, namely, the educational curriculum is based on Islamic ethics and values, it is central and its financial support is centralised, and the education of males and females is segregated. Religion constitutes an essential and integral part of education, sociology, economics, medicine, psychology, and law. School education is both free and mandatory at all levels. Higher education is free and places are awarded according to the national achievement of students. The strict version of the Islamic religion values prohibits mixing of mature boys and girls in schools and workplaces. Therefore, only female teachers can work in female schools and

vice versa. In addition, the educational system, due to religious and cultural heritage influences, gives no allowances for physical education for female pupils in the school. Despite the segregation of education, all schools, boys and girls, and at all levels adopt the same methods of teaching, textbooks, instruction, evaluation tools, curricula, and educational policy. Students residing outside the Kingdom are also supported by the Saudi government; in particular the government provides scholarship to students who want to continue their education outside the country (Website of Ministry of Education, 2015).

4.8.1.3 Japanese Classrooms

Cooperative learning has been and remains the most common technique used in Japanese classrooms since the early 1900s (Lewis, 2002a). In this model, learners work together in mixed-ability groups - a method that is commonly known as the 'Bazu Method' - originating from the "buzz" that the style of learning creates (Lewis, 2002a). It has been suggested that cooperative learning ensures that:

- There is clear collaboration in how teachers and students interact, shown by working in a supportive way.
- There is an inherent understanding of the importance of learning from one another, listening and problem solving together.
- There is an element of discovery learning within Japanese educational pedagogy, where topics of interest are studied on their own (White, 1987).

Processes are very important in Japanese classrooms where the whole process ranging from engaging in the lesson, working with others and contributing, is just as important as the outcome (Lewis, 2002a). Self-critical reflection ("hansei") is also encouraged by teachers who use specific questioning ("hatsumon") to engage learners and stimulate independent thinking (Dubin, 2009). Such questioning and thinking can enable students to create a deeper understanding of the content or issue and how that links to the wider learning framework.

In contrast with Japan, the classroom environment in public schools in the KSA is traditional where most teachers engage mostly in talking and the students listen. Students in science classes are offered opportunities to use the laboratories sometimes, based on the topic. In the KSA, students are not allowed to make mistakes or even express themselves during lessons.

The focus of teachers is about controlling the students and the class environment than giving students opportunities to either ask questions and/or engage in constructive discussions during class - even at the college level. Thus, teachers use the lecture approach in their teaching and read from notes which they did not change from year to year. Students also lack strategies for life-long learning, have difficulties doing presentations in the classroom or voicing their opinions in public. The Saudi system is fixed and inflexible in terms of schedule and does not give student opportunities to do extra-curricular activities (Altayar, 2003).

In recent years, there have been more calls for engaging students in making decisions and making their voices heard (Hargreaves and Shirley, 2009). As mentioned previously in Chapter 2, the content of the curriculum in Saudi Arabia, as a whole, does not satisfy the needs of the lives of individuals or the specialized needs of the community (Al-Sadan, 2000). The rapidity of growth and development in Saudi Arabia over the past ten years has led to changes in the curriculum to conform to the needs of students and to create links between education and practical life (Hakeem, 2012).

4.8.1.4 Japanese Professional Development

In Japan, current teachers and those studying to enter the teaching profession use LS as their central means of PD (Lewis and Tsuchida, 1998). Student teachers all follow a standardised teacher-training programme which has been developed by the Education Ministry (Nemoto, 1999). Following the completion of the teacher-training degree programme, newly qualified teachers have to complete a year's school-based induction as teachers under the guidance of a master teacher. Such on the job education is a reflection of the culture towards self-improvement within Japan (Jones and Jones, 2006; Nemoto, 1999).

Learning is taken seriously in Japanese culture (White, 1987) as it is a strong measure of success and the word "benkyoo" (study) denotes the intensity required to engage proactively in learning. Engaging in education enables individuals to continually develop and improve themselves and others (Okano and Tsuchiya, 1999). This viewpoint is why teachers are likely to participate in informal, voluntary lesson groups. Within Japanese education a learning process called "kounaikenshuu" is used for school-based PD (Stigler and Hiebert, 1999) which includes a range of activities that focus on professional growth in the classroom such as lesson studies. LS is also considered a powerful tool for change within Japanese

education because of the opportunities it provides for collaborative work amongst teachers (Darling-Hammond et al., 2009).

Watanabe (2018) highlighted that in Japan teachers are deemed to be researchers and will commonly undertake LS to enhance their knowledge and practice. This is a means of taking part in regular research, starting in their own classrooms as well as collaboratively across the school community. Another way that teachers develop is by producing professional journals for their peers with more being created by teachers than other academics (Okano and Tsuchiya, 1999). Teachers have an important multi-faceted role to play as researcher, curriculum developer and student (Clarke et al., 2013). In Japan, teachers often spend several years researching a specific theme, making changes as their learning develops (Ermeling and Graff-Ermeling, 2014).

Five core elements within Japanese PD have been identified by Corey et al., (2016) whilst conducting a study on LS teams in Japan. These are:

- 1) Professional development is deepened by the involvement of students and using real-time classroom learning.
- 2) Learning is the goal of teaching and mathematical thinking of students is central to how and what teachers choose to teach.
- 3) More learning opportunities are created through sharing lesson plans as it provides more opportunity for the detail to be analysed.
- 4) Collaboration between colleagues is central to creating shared knowledge and understanding which in turn has a positive effect on teaching.
- 5) Having a firm commitment to teaching that is shown through hard work is one of the ways that teachers will be the most successful.

According to Corey et al., (2016), all the identified core elements should be considered by teachers and schools when developing PD as well as day-to-day learning activities.

Regarding professional development in KSA, there are clear differences between the approaches adopted in Japan and KSA. The Saudi Ministry of Education sends some teachers and administrators to national universities or abroad to obtain master's or doctoral degrees. The Ministry further provides training for qualified teachers through participating in extensive PD courses and programmes throughout the year to enhance teacher performance,

based on the needs of curricular projects, some of which are developed in cooperation with specialised private sector corporations.

Teachers receive PD and supervision throughout their careers through a number of means. For example, computerised supervision allows for rapid idea exchange and information access that helps to develop teacher knowledge, teaching environments, and quality teaching outputs (Alharbi, 2011). The Ministry has also recently launched an electronic gateway for communication within the education sector to contribute to knowledge building, and to assist teachers in publishing educational research (Ministry of Education, 2019). Furthermore, a new project known as “Teach Me How to Learn” which aims to develop teaching strategies and techniques for use in and out of the classroom has been launched by the Saudi MoE. The Ministry is also preparing a project for teacher assessment to improve practical and educational outputs to build knowledge. The project also seeks to introduce changes to educational programmes based on analysis of teacher evaluations and educational trends (Ministry of Education, 2019).

4.8.2 Adoption and adaptation of LS outside Japan

Previous research on LS implemented outside Japan has highlighted how other countries have either adopted or adapted Japanese LS into their context. This section provide an overview of particular countries including Australia, the United States of America (USA), England, China, Hong Kong and Sweden, South Korea, South Africa, Qatar, and Saudi Arabia seeking to highlight when they began, as well as their peculiar approach by way of case description.

Country	Starting Year	Case Description
United States	1990s	<p>The LS model as a professional learning tool was first used in the US back in the 1990s (Lewis and Tsuchida, 1998). Since then, over 335 schools in 32 states across the country have relied on the use of the LS model as a professional development leaning tool (Lewis, 2002; Perry and Lewis, 2009). This means that thousands of teachers might have benefitted and are still benefitting from this novelty (Lewiset al., 2006). It has been described as transformational, and an openly widely accepted PD model by teachers across the US, partly because it is seen to be empowering, but also as a result of its effectiveness (Stigler and Hiebert, 1999).</p>
England	2001	<p>LS was first introduced as a teaching development strategy in the UK in 2001 (Dudley, 2014b). Between 2003-2005, the national LS pilot programme was implemented (Huang and Shimzu, 2016; Cajkkler et al., 2014; Murphy et al., 2017). Following its identified measurable impact in England, LS was implemented across England as an improvement method in 2008 (Dudley et al., 2014). LS remains a formidable professional development tool in the England today.</p>
China	1950s	<p>Much like Japan, China has a long history of LS stretching as back as the 1950s (Chen and Yang, 2013). The Chinese attitude towards LS mirrors the Japanese style in many ways including its activities' structure (Huang and Shimizu, 2016; Yu, 2007). For instance, the country has instituted a teaching research model in support of the LS model which has been utilized throughout mainland China since the 1950s (Wang, 2009). To the Chinese, the adoption of LS has helped them to focus on guiding 'teaching research', managing the teaching administration in schools, advising educational authorities, overseeing the implementation of new/revised curricula, narrowing the divide between teaching experiences and 'modern educational theories', and helping to facilitate high-quality classroom instruction (Huang et al., 2014).</p>
Hong Kong and Sweden	2000s	<p>Hong Kong and Sweden may be considered to be a unique case, given that both countries have worked jointly to develop their own, joint approach to LS, which they call 'learning study' (Huang and Shimizu, 2016). Learning study as a variant</p>

Country	Starting Year	Case Description
		of LS is a collaborative action research and theory-based style, which aims to improve the effectiveness of the students learning, by improving the professional competency of teachers and often involves a design experiment (Cheng and Lo, 2013). It is characterised by a set of streamlined intended learning objectives which can best be measured, and is informed by ‘variation theory’ (Brown 1992; Huang and Shimizu, 2016; Lo and Marton, 2012).
South Korea	2006	The South Korean LS approach is a school-based LS on a semester-long basis. This approach is based on the collaboration between elementary school teachers and teacher educators of a university working at a particular research school. Teachers who teach at the same grade level and a specialist professor in one specific subject usually compose each group on voluntary basis in that schools (Pang, 2016). The approach is growing but sustained in the country because of financial support and incentives for teachers who participate in it in recent years (Kim and Choi, 2012).
South Africa	2011	The origins of LS in South Africa is traceable to the project called "Instructional leadership through a lesson study" (Mokhele, 2017). This project was organised by the Department of Education in conjunction with a local university and implemented over a three-year period, that is, 2011-2013. The project involved sixty science and mathematics teachers who worked together through workshops. The group of teachers were supplied with detailed information about LS as well as training materials. Participants were taught the LS model and they practised all the four steps required in LS. They were then allowed to go back to their work and select teachers from their own schools or outside their schools to establish new groups and participate in LS.
Qatar	2013	In 2013, the Qatar Foundation launched a new research project called ‘Improving reading skills in the middle school science classroom’ (Reynolds et al., 2014). This project aimed to explore how reading is taught in Qatari schools, especially to counter inability in reading, mathematics, and scientific literacy among pupils (Reynolds et al., 2014). Within this project, Japanese LS was selected for developing Qatari teachers because they found that LS is the best method for enhancing

Country	Starting Year	Case Description
		teachers' professional learning. They hoped to generalise this effective model in Qatar schools over time.

4.8.3 LS in Saudi Arabia

There seem to be very few sources outlining the history of LS in Saudi Arabia. That said, from 2000, the MoE in Saudi Arabia focused on school-based PL as a method of tailoring PL to meet the needs of both schools and individual teachers. Since then, the Saudi MoE has conducted a pilot study of LS in the country (MoE, 2016). The study identified a need to:

- Adapt to successful global experiences in order to sustain PD for their teachers and create PL communities, improve the knowledge and experiences gained by teachers, and, improve the school environment.
- Bridge the gap between PD practices outside school and the actual practice within schools, (as the training delivered externally did not fully understand the internal needs of individual schools).
- Create a school-based PD model, which could be used as an example to be followed by other schools.
- Promote the idea of cooperation amongst school leaders and teachers, to cooperate in their work.
- Overcome pedagogical and educational problems which happen in Saudi schools.
- Facilitate the MoE to help schools in implementing educational and developmental projects.
- Embrace a flexible model (like LS) which could be implemented and adapted to most educational systems, inclusive of educational variables, in Saudi Arabia.
- Examine a number of international studies (such as 'The Teaching Gap') with the aim to find positive evidence supporting the benefits of LS which would meet the needs identified.

However, these findings did not highlight the necessity to employ LS to meet student needs. In 2015 the step was taken by the Saudi government to utilise LS as a method to meet these PL needs. Again, a pilot project was implemented in five regions (Riyadh, Eastern Region,

Hail, Taif, and Al-Madinah al-Munawarah), and LS is now delivered in six schools (for boys), and six schools (for girls) in each region. As a result of the second pilot project, approximately 500 teachers who teach Mathematics, Science, and Arabic Language in primary schools have started using LS as a method of professional teacher development (Ministry of Education, 2017).

The focus of this study is limited to Maths, Science and Arabic because these are the subject areas current being piloted by Saudi MoE. Maths and Science were chosen, primarily, because these are core subject areas considered fundamental to education at the basic level across countries, and most of the countries which implemented LS started with Maths and Science as well. Specific to the Saudi context, it is also because students have scored low grades in Maths and Science in international tests like TIMMS and PISA in the past. However, the addition of Arabic was the discretion of the Saudi MoE, who thought that the addition of the national language was valuable because it is the first language of Saudi teachers and students.

Within the context of Saudi schools, teachers generally plan and teach individually with little or no interaction with colleagues. The Saudi culture does not encourage teachers to share their experiences. They tend to employ traditional PD tools which results in teachers working in an isolated manner. Isolation is a common phenomenon in the Saudi educational system because the teachers are able to work in privacy and this protects them from criticism (Alghamdi, 2019). Moreover, teachers may not perceive any benefits from working in groups. It could be argued that in Saudi Arabia, teachers are hindered from improving professionally as there are no policies or procedures that enable the teachers to jointly: collaborate, plan, teach and observe one another. Alshamrani et al., (2012) have noted that teachers' PD in Saudi Arabia has been deemed a national priority. This means, that some actors recognise a need to transfer from traditional training programmes to PL opportunities which encourage teachers to work together. In this regard, LS is expected to help reduce the number of teachers working in isolation, and act as the primary tool to help PL - given that it encourages teachers to work, plan, teach, and share ideas collaboratively.

4.9 Specific Relevant Studies within the Arabic Context

LS is impacted by the culture and attitude of teachers towards its adoption and use as a strategy in any context (Abdul-Jawad, 2008). The review of studies within the Arabic context can therefore play a significant role in understanding the LS model in the Saudi context. This section explores such literature. For instance, in a study of 25 mathematics teachers in Egypt, an observation card and a teacher's and learner's guide were used to explore the effectiveness of PD of mathematics teachers using LS in light of the Japanese experience. The researcher employed both descriptive analytical and experimental approaches. The study aimed to develop a framework for the implementation of LS and in order to meet some of the national standards for teachers in Egypt (Abdul-Jawad, 2008). Further, a training programme on LS was to be developed for mathematics teachers at the end of the study. Overall, the study arrived at the following findings:

- 1) Development of the appropriate educational activities.
- 2) Using teaching strategies that meet students' needs and facilitate the acquisition of effective learning experiences.
- 3) Grasp of the academic structure and nature.

In another study that aimed at identifying the impact of a training programme based upon a suggested LS model, Safaa (2010) explored how LS helps in the development of the skills of verbal interaction, lateral thinking and professional loyalty among general diploma students, and social studies major students at the faculty of education in the Wadi Al Jadid Teaching College in Egypt. The researcher employed the descriptive approach in the theoretical part of the study and the quasi-experimental approach in the field-related part of the study. The study sample consisted of a group of 25 second-year general diploma students. The study instruments consisted of teaching instruments, represented by the training programme and evaluation instruments, namely an observation card for the verbal interaction skills, lateral thinking test and teacher's professional loyalty score. The findings of the study highlighted the existence of statistically significant differences at $n = 0.01$ between the average scores of the study group in the prior and post-measurements/applications of verbal interaction skills, lateral thinking test and teacher's professional loyalty as recorded in the observation card in favour of the post-measurement/application.

Another study by Abdul Baset (2011) explored the theoretical basis for LS as a strategy and its relationship with the teacher standards as included in the national educational standards and proposed LS training programmes in Egypt. The researcher employed a mixed method with a study sample of 30 participants. The research instruments, designed by the researcher consisted of an observation card to measure the performance aspect of the teacher's standards and an observation card for reactions to lesson validity. The researcher further prepared a test designed to measure the cognitive dimension of the study. The research findings highlighted the following:

- 1) Effectiveness of the proposed training program, based upon the LS strategy in meeting some of the teacher-related standards included in the national educational standards document among social studies students.
- 2) Effectiveness of the proposed training program, based upon the LS strategy in the cognitive aspect.
- 3) Demonstration of qualitative responses that confirm a high response level exhibited by trainees towards training program, based upon the LS strategy.

Similarly, Merwad (2014) studied the use of contemplative LS strategy in terms of developing specialized teaching competences among secondary stage history teachers in Saudi Arabia. The aim was to identify and measure the impact of a proposed training program. The researcher prepared a list of the specialised teaching competences that must be developed by secondary stage history teachers. The study employed a mixed method approach and the sample size was 24 secondary stage history teachers. The study participants were divided equally into a control group and an experimental group. The study instruments consisted of an observation card used to measure the performance-related specialised teaching competences and a questionnaire prepared by the researcher to identify specialised teaching competences that must be emphasised in the course of in-service training programmes from the perspective of secondary stage history teachers. The researcher further prepared a LS-based training program, a trainer's guide and a test to measure the cognitive dimension of LS. The research findings indicated that the proposed contemplative LS-based training programme had a significant impact upon the development of the cognitive aspect with the correlation coefficient of correlated dual pairs amounting to 0.861 and a very significant impact upon the development of the performance-related aspect of the specialised teaching competences with the correlation coefficient of correlated dual pairs amounting to 0.923.

In the same vein, a study by Al Khalif (2016) aimed at building a training programme based upon the Japanese experiment involving contemplative teaching and measuring its effectiveness in developing teaching performance of preparatory school teachers within the Ar Rass city in Saudi Arabia. This was a qualitative research with 15 preparatory school teachers as research participants. The study instruments consisted of an observation card to measure the teaching performance. The study results indicated the existence of a statistically significant difference at less than $n= 0.05$ between the prior and post measurements of teacher performance averages in the steps of emphasis, teaching, training and evaluation in favour of the post measurement.

Finally, in a study that aimed to explore the perspectives of primary school mathematics teachers regarding the use of LS as a strategy in teaching mathematics, Alamri (2020) sampled 149 primary school mathematics teachers in Riyadh, Saudi Arabia, through purposive sampling. The 149 sampled were sent a quantitative questionnaire via either e-mail or mobile contact among them, 15 teachers took part in a qualitative interview. The findings demonstrated that most of the sample conduct LS activities representing between 61.7% and 89.9%. In terms of impact, the results also showed that the implementation of LS has such a high impact on the professional development of mathematics teachers. Cumulatively, it was suggested that their participation in the LS strategy helped them enhance their knowledge, mathematically and pedagogically. It was also indicated that LS improved their knowledge of students' learning process and influenced their views regarding lesson study.

In view of all that has been mentioned so far, it is obvious that all recorded studies within the Arab context are mainly evolutionary in nature. That is, they only tend to evaluate LS after its implementation in a training programme. This is different from the present study that investigates teachers' perspectives after using LS as a PD model for a long time. This provides justification for this study.

4.10 Challenges of Using LS Outside of Japan

When a brilliant American teacher retires, almost all of the lesson plans and practices that he or she developed also retire. When a brilliant Japanese teacher

retires, he or she has left a legacy to be enhanced by future teachers (Chenoweth, 2000).

By way of definition, LS can be defined as the planning, organisation and observation of classes as well as discussions post-lesson. Whilst LS has a long history in Japan, it has only become more common in other countries from as recently as the late 1990s (Yoshida, 1999). The concept of LS began to gain international attention at the end of the 1990s. Its popularity outside Japan is traceable to the work of Stigler and Hiebert who wrote about how Japanese teaching has exceeded that of other developed Western countries in relation to student achievement (Stigler and Hiebert, 1999). In the past two decades, the teaching profession in the U.S., England, Singapore, Australia and Finland has been amongst the many countries exploring the use of LS in order to facilitate teaching and learning (Robinson and Leikin, 2011). However, their earlier attempts were critiqued as being overly focused on the theory, philosophy and principles underlining the use of LS without due regard for any cultural differences peculiar to their individual countries (Takahashi and McDougal, 2016; Yoshida, 1999). For example, Huang & Shimizu (2016) suggested that the application of LS is influenced as much by local factors such as regional legislation and school teaching norms, as other impact factors often labelled as macro-level (educational system) and micro-level (other prevailing conditions) factors. Nonetheless, different countries outside Japan tend to experience different challenges in the adaption and implementation of LS. These challenges are persistent and enduring. For instance, a notable challenge that threatens the successful implementation of LS across countries, including Saudi Arabia, is the simple introduction of LS by means of a "copy-paste" method without truly understanding the cultural nuances between Japan and the adopting country (Ebaegu, 2018). It is also important to understand the diversity of local cultures where LS is to be implemented (Doig and Groves, 2012).

Lewis (2015) identified and used the tendency of an individualistic and non-collaborative teaching culture in understanding the role of participants in LS in the USA. It was suggested that American teachers view teaching as an individual private work where their classrooms are isolated from others, so they are reluctant to open their classrooms for research lessons (Lewis, 2015).

Another challenge associated with the adaptation of LS outside Japan is that while the Japanese curriculum is structured to be problem-solving (Lim et al., 2016; Verhoef et al.,

2014; Warwick et al., 2016), this is not always part of the curriculum of other countries including Saudi Arabia (Lewis, 2015). As a result, teachers in these countries may not know how to create and deal with problems of that sort (Widjaja et al., 2017). For instance, one of the challenges in dealing with structured problem-solving for Australian teachers is predicting student solutions (Groves et al., 2016). To resolve this issue, they tried the problem in various classes at the same stage ahead of using it in the research lessons. This allowed them to define a range of possible solutions for students, anticipate student problems and develop ideas for class discussion (Groves et al., 2016). Furthermore, Fujii (2014) indicated that while teachers across Malawi and Uganda used structured problem solving, they did not use it to build student understanding, but it was used as a way of solving problems.

In the case of Saudi Arabia, research suggests that the majority of Saudi teachers do not use a problem-solving strategy in their teaching. Alreshidi (2016) pointed out that Trends in the International Mathematics and Science Study (TIMSS) 2011 results show that the percentage of Saudi students whose teachers were very comfortable in teaching their students a range of problem-solving strategies was significantly lower than the international average, respectively. As a result, it is apparent that Saudi teachers require training in problem-solving, successful homework, and other innovative teaching techniques that have proven successful in other countries.

4.11 Teacher Knowledge and Types

Stigler and Hiebert (1997) suggested that teachers are important actors for the purpose of making improvements to advance educational systems because of their unique role in the transaction of information in the class. They argued that this enables teachers to understand and (attempt to) solve problems faced by students. Lampley (2015, p. 3), went further to consider teachers to be the “driving force, for student learning”, arguing that they must possess a wide range of information in order for their learners to be successful. Additionally, it has been strongly argued that in order to teach effectively it is fundamental to know and understand a subject well (An et al., 2004; National Council of Teachers of Mathematics, 2000; Kolb, 2015). To reiterate this point, Darling-Hammond, (1998) argued that a deep understanding of the subject matter (also known as ‘content knowledge’) is fundamental to help learners interact and relate with each other, address mutual misconceptions, and to create useful cognitive maps. In a similar vein, Hill et al., (2004; p10) point out that Shulman

and his colleagues consider ‘teacher knowledge’ to be essential to teach a subject. Kind (2009) also suggests that teachers must also possess a high concentration of pedagogical knowledge (or, effective teaching skills). However, Shulman (1986) concluded that, to teach a subject in a style that facilitates student understanding, teachers need both the content, and pedagogical knowledge, and referred to this as Pedagogical Content Knowledge (PCK). He indicated that this concept enables the teacher to understand the best ways to teach a subject using multiple instructional techniques, explanations, and examples.

However, this approach could be disputed as it suggests that a teacher who has a high degree of PCK would be more successful than one that does not. This implies that a teacher of one subject (say for example, Science) may not be as good, or better, at teaching another subject (such as French, or Religious Education). It could also be argued that having a broad and varied outlook can sometimes help learners in diverse ways, so an expert in one subject may offer some unique insights to learners in another subject. This view implies that a teacher with a high proficiency of pedagogical knowledge, and not as much content knowledge, could be better than teachers who possess both, which conflicts with Shulman’s idea above.

Nonetheless, Shulman (1987, cited from Kolb 2015; p. 11) highlighted seven categories of teacher knowledge that focus on the role of CK and content-based knowledge in teaching as illustrated in Figure 4.4 below.



Figure 4-3 Framework of teacher knowledge from Shulman (1987).

- General pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend the subject matter.
- Knowledge of learners and their characteristics.
- Knowledge of educational contexts, ranging from workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures.
- Knowledge of educational ends, purposes, and values, and their philosophical and historical grounds.
- Content knowledge.
- Curriculum knowledge, with a particular grasp of the materials and programmes that serve as the “tools of the trade” for teachers.
- Pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers and their own special form of professional understanding.

The work of Shulman centered on three broad categories – that is, curriculum knowledge, CK and PCK. The curricular knowledge addresses how a teacher is familiar with topics from different subjects and subject topics taught at different year levels. CK is defined in this research as, "the body of knowledge and information that teachers teach and that students are expected to learn in a given subject or content area, such as English Language, Arts, Mathematics, Science, or Social Studies (The Glossary of Education Reform, 2016). The emergence and development of PCK is considered an important milestone in the teacher education community. This is explored in greater detail below.

4.11.1 Pedagogical Content Knowledge (PCK) development

PCK is commonly defined as the knowledge base that is necessary in order to transform subject matter knowledge in ways that are comprehensible to students (Grossman, 1990; Shulman, 1986). It involves a teacher’s “understanding and enactment of how to help a group of students understand specific subject matter using multiple instructional strategies, representations, and assessments while working within the contextual, cultural, and social limitations in the learning environment” (Park and Oliver, 2008, p. 264). Studies which intend to develop teachers’ PCK are well-documented (Park and Oliver, 2008; Vale et al., 2011). The development of teachers’ PCK involves a shift in the teachers’ understanding

“from being able to comprehend subject matter for themselves, to becoming able to elucidate subject matter in new ways, reorganize and partition it, clothe it in activities and emotions, in metaphors and exercises, and in examples and demonstrations, so that it can be grasped by students” (Shulman, 1987, p. 13). Practically, PCK development takes time and is complex. It normally occurs in phases and relates to trainees’ abilities to integrate knowledge from a variety of sources (Kind, 2009).

4.11.1.1 Approaches to PCK Development

Ascertaining approach: This approach seeks to examine the way teachers’ PCK evolves throughout their career or a training programme (Park and Oliver, 2008). PCK development is a complex process where “knowledge acquisition and knowledge use are interwoven within the context of instructional practices” (Park and Oliver, 2008, p. 278). The teachers’ PCK becomes salient when they encounter contingent moments in their teaching (Park and Oliver, 2008).

Intervention approach: This approach helps in investigating the impact of a particular intervention to teachers’ PCK. For example, Vale et al., (2011) conducted a PL programme for mathematics secondary teachers. They found that positioning practicing teachers as learners of mathematics could support them in making the connection between mathematical concepts, thus supporting their PCK development (Vale et al., 2011).

The use of LS: Some researchers have used LS to develop teachers’ PCK. For example, Lucenario et al., (2016) conducted a quasi-experimental study comparing a LS group and a non-LS group of chemistry teachers in the Philippines. The researchers pointed out that the teachers in the LS group showed higher teaching competences than those in the non-LS (Lucenario et al., 2016).

4.11.1.2 Factors Influencing the PCK of Teachers

- It has been suggested that the possession of CK is an influencing factor of PCK to some degree (Kind, 2009; Hill et al., 2008). It is argued that this explains why most studies on teachers’ PCK are topic-specific (Henze and Van Driel, 2015).
- Teachers’ professional backgrounds may affect their PCK (Grossman, 1990). Teachers also acquire PCK from actual teaching experience as well as from PD. While working with students, teachers learn about the strategies that work and student misconceptions and prior knowledge of specific topics (Grossman, 1990).

- Education qualifications may influence the PCK of teachers.
- Length of teaching experience affect PCK (Kleickmann et al., 2013). In their three-year longitudinal study, Angell et al., (2005) compared the PCK of novice and expert physics teachers and found little difference in CK between the two groups. However, they reported that the expert teachers made more extensive links between their knowledge within different contexts and exhibited richer pedagogical skills, while the novice teachers were primarily concerned with transmission of correct content.
- Lannin et al. (2013) indicated that teachers' focus on a particular PCK component shapes their PCK development. In other words, when teachers are focusing on developing tasks, their PCK will develop accordingly. Furthermore, Park and Oliver (2008) argued that students' responses and misconceptions shape teachers' PCK.
- Veal (1999) believed that development of teachers' PCK is based on existing beliefs influenced by how they themselves were taught. He stated that in order for PCK to develop, teachers needed to reflect on their beliefs about epistemology and change existing beliefs to accommodate new beliefs.

4.11.1.3 Significance of PCK

- PCK distinguishes novice from expert teachers (Park and Oliver, 2007).
- It can provide a theoretical framework for understanding and examining teachers' skills (Abell, 2008).
- PCK has been identified in many reform documents as a knowledge base that teachers should possess (Kind, 2009).

4.11.1.4 Critiques of PCK

Shulman (2015) identified four main limitations of his original notion of PCK.

- The omission of non-cognitive attributes such as “emotion, affect, feelings and motivation” (p. 9). Other scholars highlighted the need to take into account teachers' beliefs as elements of teachers' PCK (Henze and Van Driel, 2015).
- Pedagogical mind instead of pedagogical action. PCK emphasised a lack of attention on the teaching in action.
- PCK does not seem to take into consideration social and cultural context. However, it is common knowledge that teaching and learning cannot be separated from the social and cultural context (Tirosh et al., 2011).

- That the original notion of PCK missed out the relationship between the way teachers teach and student learning.
- The model itself was considered by many as too simplistic (Kind, 2009; Park and Oliver, 2008).

However, it could be argued that these seven categories of teacher knowledge would not be appropriate in the context of countries where teaching is based on ‘religion’. An example of this would be Saudi Arabia, where all subject curricula (including core subjects such as mathematics, and science) are based on Islam (The Educational Policy Document, 1969). In those countries, teachers are required to have a high degree of knowledge concerning the Islamic religion before they are measured on their subject content knowledge.

Another example of PCK is illustrated in Figure 4.5 below.

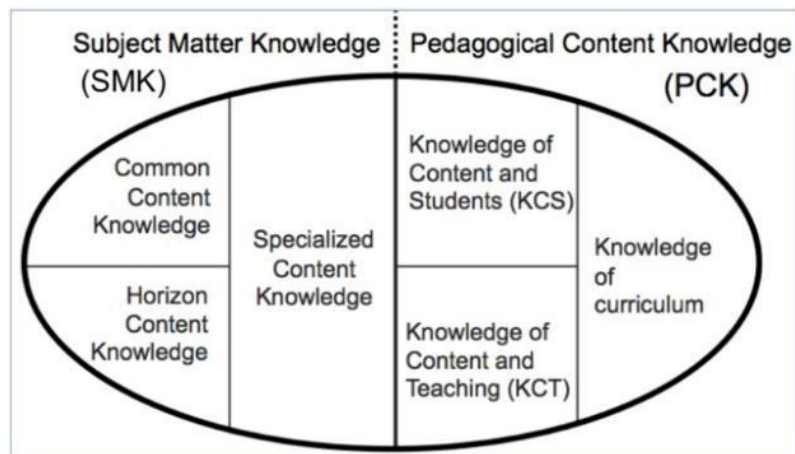


Figure 4-4 Framework of Mathematical Knowledge for Teaching from Ball et al. (2008).

Ball et al., (2008) define PCK as the knowledge of content. They divide PCK into two sub-categories – that is, the Knowledge of Content and Students (KCS) and Knowledge of Content and Teaching (KCT). KCS refers to teacher awareness of how students learn specific content and provide teacher knowledge of common misconceptions that students have. KCT on the other hand includes knowledge of teachers of different approaches and strategies which can be used to teach a certain topic and the different questions which can better illuminate a subject for students.

Ball et al., (2008) have defined in detail the required knowledge by mathematics teachers in decision-making, actions and practices in their Mathematical Knowledge for Teaching

(MKT) structure. Similarly, Margolinas et al., (2005) suggested a model outlining the multitude of teachers' actions and skills required during different stages in their teaching, ranging from the overarching pedagogical values underpinning a lesson to the didactic action in the classroom. Yet, it remains difficult to categorise all the knowledge needed by those who teach discipline.

As a result, Ni Shuilleabhain and Clivaz (2017) presented a new theoretical framework in mathematical knowledge for teaching during LS process (see Figure 4.6 below). This new theoretical framework is an expanded method that incorporates the theoretical frameworks of teaching mathematical knowledge (Ball et al., 2008) and teacher activity levels (Margolinas et al., 2005). It is also situated as a method for documenting and evaluating the use and evolution of mathematics teacher knowledge in planning, performing and reflecting on research lessons in a LS process.

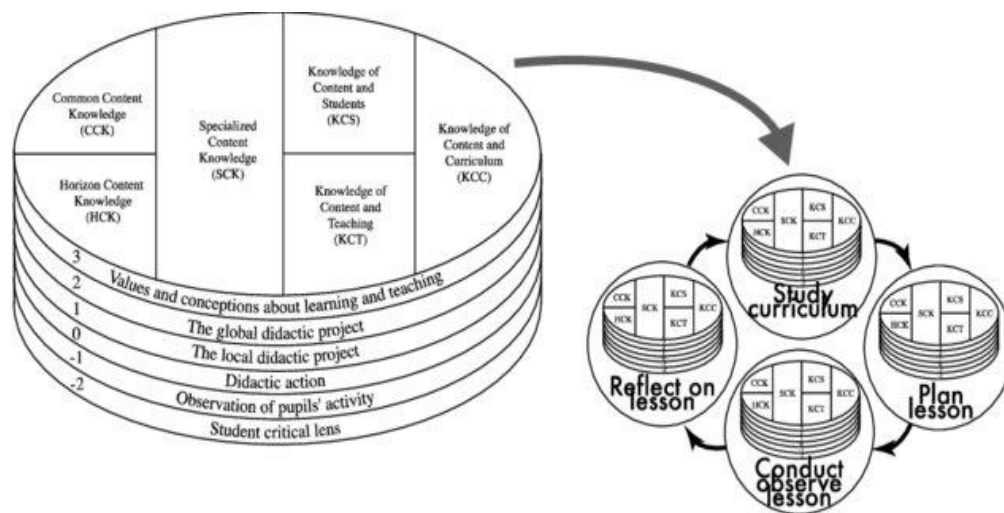


Figure 4-5 MKT and levels of teacher activity at LS phases. Ni Shuilleabhain & Clivaz (2017).

4.11.2 Tacit Knowledge

As indicated above, scholars suggest that LS is a highly effective model, which can aid inexperienced and experienced teachers to learn. Dudley (2014a) suggested that this is largely due to the closeness of the stages of interaction for the LS group – jointly observing, jointly planning, and jointly analysing, enables the teachers within the group to collectively ‘imagine’ learning. He indicated that this helps teachers to understand student learning from other teachers’ perspectives as well as through their own. This is followed by the group

observing and comparing actual learning, from the research lesson, with the learning that was imagined by the teachers when they planned it. Dudley (2014; p.4), further suggested that this forces teachers to become conscious of things that they may normally not be aware of, as the teacher would filter those things out, or that they would be managed by the teacher's "tacit knowledge system".

Polanyi (1962a) described tacit knowledge as experiences of teachers which are often not articulated, but rather embodied in the person. According to Polanyi (1962a, p. 2), "we can know more than we can tell". Therefore, tacit knowledge allows for the handling of situations successfully without being able to describe every part of what was done. Furthermore, Polanyi (1962b, p. 14) asserted that "it is not by looking at things, but by dwelling in them that we understand their joint meaning". By teaching and dwelling in many situations in a school context, teachers can develop deep tacit knowledge. It is primarily connected to practical knowledge of how to handle various situations through experiences that have led to intuitive knowledge (Janik, 1996).

4.11.2.1 Characteristics of Tacit Knowledge

- Tacit knowledge underlies conceptions about teaching and learning.
- It is the basis for how situations are handled and interpreted.
- Tacit knowledge is embodied in the person and can be seen in the way the person handles and assesses situations (Bulterman-Bos, 2008).
- Tacit knowledge of expert teachers can be shared, the entire profession and not only individual teachers can gain from it (Hiebert et al., 2002).
- If unconscious strategies that are not successful can be challenged, they also can be replaced or revised to more powerful strategies. Active reflection among colleagues can, at least to some extent, make tacit knowledge visible (Dudley, 2013).

4.11.2.2 Critiques of Tacit Knowledge

Ryle (1963) argued, to know how and to know what, are not two different kinds of knowledge, instead practical and theoretical knowledge are intertwined. In an act that is performed skilfully, the mind and the handling of the act are not separated. It is the same process. Similarly, Janik (1996) described professional knowledge to include practical, experience-based knowledge as well as theoretical knowledge that is acquired from literature and education. Furthermore, Dudley (2013) argued that not all tacit knowledge is an asset

for teachers in their teaching. For instance, the tacit knowledge of a novice teacher may not be as significant as that of an experienced teacher.

Exploring the concept of tacit knowledge is particularly significant to this study because such knowledge is necessary in order to fully perceive what happens in a classroom in relation to teaching and learning. This is particularly important, as Wragg et al., (1996) stated that, after three years' experience, teachers have become good teachers because they might have explored new ways to solve and manage the difficulties, and challenges that they face in the classroom. According to Noel Burch's 'Conscious Competence Ladder', an individual who is 'unconsciously competent' (tacit) at conducting tasks, may be considered to be a highly skilled person at conducting those tasks (Van Nieuwerburgh and Passmore, 2012). This may be the reason why Wragg et al. (1996) identified these individuals as 'good teachers'. These points imply that teachers become accustomed and acclimatised to classroom practices through their experience. This also indicates that they have obtained the practical knowledge, and that much of these behaviours have become tacitly ingrained. Dudley, (2014a), also pointed out that it is clear for the research group to observe a teacher's 'tacit knowledge' during the observation step, when a teacher is delivering a research lesson in front of the group. McAdam and McCrory (2007) designed a model which emphasis the delineation of tacit and explicit knowledge (see Figure 4.7 below).

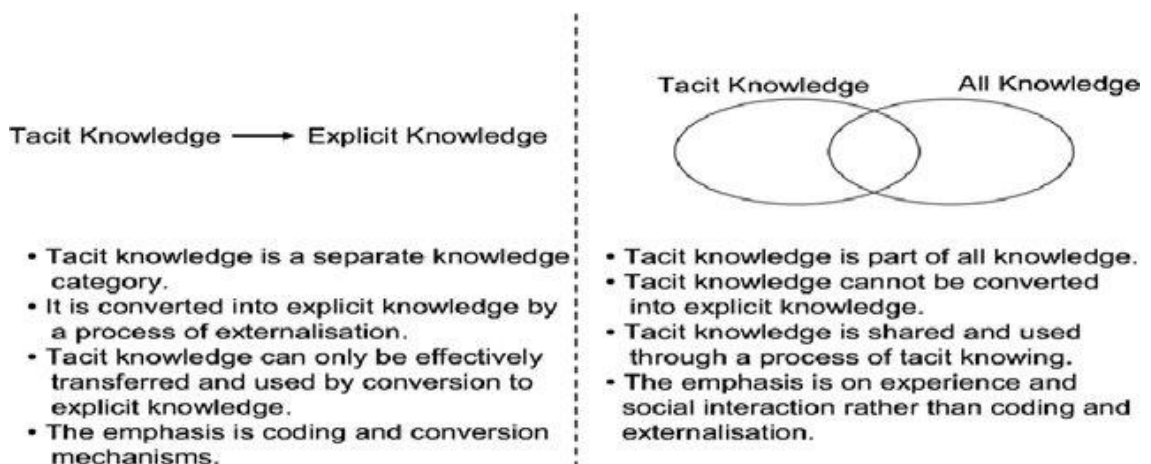


Figure 4-6: Tacit & Explicit Knowledge Continuum. Source: McAdam, Mason B, & McCrory (2007).

4.11.3 Content Knowledge (CK)

Educators must possess adequate knowledge of the content they are delivering and the broader discipline, in order to teach effectively. There are various means of testing whether knowledge has been passed on to students on the relevant subjects which also provides a mechanism for gauging the opinion of students (Fernandez and Yoshida, 2004; Hiebert and Stigler, 2000). It can be assumed that educators aim to become experts in the content they are delivering so that they can support their students' learning as best as possible. However, having such mastery over a subject is not automatic (Chokshi and Fernandez, 2004). Amongst other methods, one way that teachers can become better masters of their subject areas is to learn through their lessons (content knowledge) as well as share their knowledge with colleagues through discussions that might highlight areas that they are less familiar with and lead to collaboration (Chokshi and Fernandez, 2004).

Lesson planning is the key step taken by educators before the lesson is delivered in order to enhance their content knowledge. This allows for information and knowledge to be gathered from materials which can provide a deeper insight into what is already understood. During lesson planning, educators also devise the most effective techniques to deliver the content in a way that is most relevant and meaningful for that specific class (Fernandez et al., 2009). Besides lesson planning, teachers can also enhance their CK and general practice through the observation of other teachers. This demonstrates the way that discussions are held, what interactions take place, and how students respond as well as provide more opportunity for them to engage with the content themselves. By increasing their knowledge, the educators are better placed to provide an enhanced learning experience for their students (Hiebert and Stigler, 2000; Ylonen and Norwich, 2012).

Teachers are enhancing their knowledge which is only going to have positive effects on their practice by studying the content of their subjects more themselves to prepare for lessons (Fernandez and Yoshida, 2004; Lewis et al., 2004). Having a system in place that includes studying the content for lessons that are to be delivered improves the pedagogical approach that teachers take as it helps them to develop a fuller understanding of the subject area. This impacts positively on the delivery of lessons and the manner in which they engage with learners (Lieberman, 2009).

4.11.4 Pedagogical knowledge

The concept of pedagogical knowledge also known as the knowledge of teaching and learning refers to the specialised body of knowledge that teachers often gain through reflection on their practice when directly engaging with students in the classroom (Allan, 2022). Guerriero (2017, p.13) defined pedagogical knowledge as “the specialised body of knowledge of teachers for creating effective teaching and learning environments for their students.” Therefore, pedagogical knowledge is concerned with the creation of effective teaching and learning environments for each and every student including, for example, knowledge of how to structure learning objectives, lesson planning, lesson evaluation, effective time management as well as strategies for differentiated instruction, and knowledge of how to design tasks for formative assessment (Schleicher, 2016). Pedagogical knowledge also includes specialised areas of “learning”, for instance, having prior knowledge of certain students’ characteristics that might facilitate their learning (König et al., 2011; Shulman, 1986, 1987; Voss, Kunter and Baumert, 2011).

It has been long argued that LS has been used as a form of pedagogical knowledge development in order to inform future teaching (Dudley, 2013; Allan, 2022). LS is a collaborative strategy for developing the pedagogical knowledge of teachers, by providing them with opportunities to investigate their own practice (Lewis et al., 2006). Schön (1991) distinguished between two types of reflection, namely, “reflection-in-action” which supports knowledge construction during the event and “reflection-on-action” which supports knowledge construction after the event. Based on Allan (2022), LS is a powerful means for teachers to engage in the two types of reflection when interaction happens between the LS team and the students in the classroom during and after the lesson. The term ‘LS’ intends to develop teacher knowledge through encouraging teachers to observe, evaluate, and reflect on their practice (Alan et al., 2018). LS offers teachers a unique opportunity to grow their understanding of how students respond to different stimuli – what they do, how they learn, and so on - through practical experiences in their own schools. The collaborative approach of LS is also designed to help improve the capacity for pedagogical knowledge sharing amongst teachers. LS; therefore, provides teachers the opportunity to carry out research, as well as develop their pedagogical knowledge, for instance, identifying more effective ways to teach a subject (Dudley, 2011; Allan, 2022).

Cerbin and Kopp (2006; p.254) argued that LS is a very positive approach to building pedagogic knowledge as it “encompasses the full complexity of teaching and learning in the context of a single lesson”. They further argued that LS is a meaningful and manageable level of analysis for investigating teaching and learning (Cerbin and Kopp, 2006). It has also been highlighted that the classroom is a powerful space for teachers to generate and develop innovative ways of improving students’ learning (Kazemi and Hubbard 2008; Opfer and Pedder 2011). Although LS can be time-consuming and costly depending on the context (Lewis et al., 2013), it can help teachers effectively develop their pedagogical knowledge, transform relationships, gain deeper understanding of children’s learning, and promote opportunities for non-privileged children to contribute to teaching (Allan et al., 2020). Furthermore, through LS, teachers focus on knowledge-generating experiences (Bjuland and Mosvold, 2015) and creative strategies that can transform the effectiveness of teacher learning (Opfer and Pedder, 2011).

In line with Allan (2022), Opfer and Pedder (2011) argued that teachers’ methods of teaching, and their professional learning practices inform and in turn are informed by pedagogical knowledge. This means that by creating the needed space for dialogic engagement, LS facilitates capturing the voices of those considered lacking the necessary capital to fully engage in schooling. To put it differently, LS can be considered as a powerful means to improve understanding student engagement within the classroom which can shape pedagogical knowledge and teachers’ practices.

4.12 LS and Collaborative Discourse

A study by Suzuki (2012) looked at the post-lesson discussions of teachers as a means to analyse the information obtained by teachers and how they cascaded that learning to students. This type of discourse analysis focusing on the language of teachers demonstrated that the educators made more pragmatic decisions about their lessons as these decisions were based on their knowledge and understanding of a subject area. In this study, Suzuki specifically analysed the language used by educators and themed the language as either problem-solving or problem-setting.

The type of language that was categorised as problem-solving was questions that could be seen as quite generalised such as “Was the teaching effective in teaching X?”, “Did the pupils learn what was expected of them?” and “Did the children learn what the teacher intended?”

The problem-setting language was more focused on the teachers themselves being able to create knowledge from the situation. Examples of this include “Did the teacher teach what the children learned?” and “What did the teacher learn from watching the children learn?”

It has been amply demonstrated in the literature that using LS as a PD tool to support educators is an effective means to enhance their practice (Lewis et al., 2004; Puchner and Taylor, 2006; Ylonen and Norwich, 2012). Problem-setting language, as discussed above, is a more complex discourse that benefits from engagement between individuals involved and how they react to one another (Goleman et al., 2002).

Educators that undertake LS are making their practice more public by openly discussing it and sharing their opinions on it. For them, to develop they need to be comfortable in highlighting what is working, and what is not as that is how they will best learn. Despite helping teachers to often feel unnerved when teaching in front of colleagues or those they know (Byrum et al., 2002; Chokshi and Fernandez, 2004); they are also more likely to be open and transparent as well as feel safe and supported through LS (Puchner and Taylor, 2006). This sense of support, collaboration and familiarity, which goes against the usual way of PD in teaching suggests that the LS approach is of great benefit.

Collaborative discourse is enhanced through a number of ways. For instance, through successful PD within education settings, core teams are usually supported to facilitate collaborative discourse using LS. This will mean that principals will firstly have to get on board to approve any decisions around the development and/or learning communities. They must show that they want to create a supportive culture in the school that allows for development. Once this is done other members of the team will put such policy into practice. Administrative support will also be required for ensuring that there are schedules for lesson studies and that teachers can get involved in them. Furthermore, support via funding might be required to enable teachers to participate.

A more direct way that school leaders can get involved is through coaching and mentoring teachers. Such direct support shows that principals are committed to the development of their staff team and want to nurture a supportive school community. Having a principal on board in this way will be the foundation of a successful PL community (Louis et al., 2010; Printy, 2008).

Another dimension of collaborative discourse in LS is the provision of feedback through debrief. This open dialogue does not only enable feedback throughout a process, but it can also be used to generalise the feedback and reduce the likelihood of any constructive criticism being taken personally by an individual (Lieberman, 2009; Ylonen and Norwich, 2012). The use of debrief in the form of collaborative discourse in LS also helps to actively avoid conflict and confrontation (Perry and Lewis, 2009). The most effective way to move forward is by engaging, but without personalisation, so that constructive debate and discussion can take place and individuals are given the opportunity to grow and develop (Chokshi and Fernandez, 2004; Lewis et al., 2012; Ylonen and Norwich, 2012).

4.13 Constructing Collaborative Norms

Collaboration across learning is one of the central ways that teachers can improve their practice. There is particular strength in working alongside or observing colleagues as well as sharing learning with each other (Lieberman, 2009). However, teachers must be aware of the possible vulnerabilities they are exposed to when they agree to share on such an open level, especially as this could hinder collaboration in a LS team. Everyone in the team from participants to leaders must be aware of the fragility that can stem from collaboration and work in a way to mitigate that wherever possible. To do this, a sense of community should be created. This can be done by creating a space where participants feel safe, respected, valued, fully engaged and able to be open and honest (Lewis and Hurd, 2011). They should work collectively to decide the guiding norms around their psychosocial behaviour with participants being able to select one norm to set their focus per meeting (Perry and Lewis, 2009). These norms should be monitored throughout the LS process.

Another factor to be considered in the effective LS team development is having a strong consensus. This is vital for a team to work effectively and is a crucial skill for individuals to have because not being on the same page does not only stall progress, but it can also cause friction amongst individuals and lead to poor time management (Lieberman, 2009).

Feedback and reflection are also important parts of the development and learning process. This can happen on an individual level but also as a group where the leader will be able to observe and make a judgement on how to guide the group towards positive outcomes (Perry and Lewis, 2009).

Puchner and Taylor (2006) highlighted power-sharing as an important factor within LS teams. Creating roles for individuals such as facilitator, timekeeper or minute-taker enhances engagement through the creation of agency (Lewis and Hurd, 2011) as well as enabling job functions to be more efficiently managed and thus leading to fewer incidences of 'burn out'. Some of the more intensive roles could be shared such as facilitation (Lewis and Hurd, 2011), although this is not necessary if it is not right for a specific team as sustaining norms is often more beneficial for participants, and it creates consistency and clarity.

4.14 LS as an Approach to Professional Learning

The National Governors Association, Council of Chief State School Officers, & Achieve (2008) found that U.S. students perform less well compared to students from other developed countries. In the 2006, Programme for International Student Assessment (PISA) study of 15-year-old mathematics students, the U.S. only ranked 25th out of 30 countries (OECD, 2007). Added to this research by Ma (2010) that suggested that U.S. teachers have insufficient subject knowledge within mathematics and there is pressure on teachers to improve the quality of teaching, particularly in this subject area.

The U.S. has a public-school system that has been open to criticism across society for failing to provide adequate results (Darling-Hammond et al., 2009). Darling-Hammond et al., (2009) suggested that the increased level in standardised testing was a result of educational attainment not being high enough. However, this does not address the issue with the quality of teaching which is the key to success within education.

Activities and interventions designed to improve the quality of teaching in the U.S. have been criticised for not being long-standing, effective and for not having continuous improvement as the central goal (Fernandez and Yoshida, 2004; Stigler and Hiebert, 1999; Takahashi and Yoshida, 2004). The format of PD is one factor that could contribute to its lack of impact. Such opportunities are impersonal and non-collaborative such as talks taking place in large auditoriums with the focus being on issues like how to improve test results or updated content in textbooks (Darling-Hammond et al., 2009; Yoon et al., 2007). This format means that there is a lack of direct connection between teachers and that they have little or no opportunity to reflect directly on their classroom experience (Schmoker, 2006). Furthermore, this style does not enable an accumulation of learning and development which teachers can build on as well as share amongst themselves (Darling-Hammond and

Richardson, 2009). For this to be improved there needs to be an improved concept for PL which takes into account the needs of teachers and learners whilst focusing on improving the quality of education.

4.15 The Professional Learning Community (PLC)

This is an alternative to the traditional non-interactive PD approach outlined above. The professional learning community (PLC) consists of a group of teachers sharing their knowledge to improve their practice (Dufour et al., 2010). This format creates more sustained and engaged interactions through more regular contact than one-off training events and therefore enables a deeper level of knowledge and reflection. These communities became more common in the U.S. in the 1990s as research identified the impact that they could have (Hipp et al., 2008).

Following that period, LS was recognised as a type of PLC by the National Staff Development Council. LS in the U.S. has since been seen as one of the most effective ways to develop learning communities in education settings (Darling-Hammond et al., 2009). LS is popular amongst American teachers for a number of reasons. For instance, LS popularity is partly due to the ability it gave teachers to plan and evaluate lessons as well as the opportunities for observation (Lewis, 2006). The LS approach is now most commonly used within mathematics and science although it can be used across all disciplines including literacy and history (Halvorson and Lund, 2013).

Researchers have identified professional learning communities (PLCs) as one of the most effective ways to bridge the “knowing-doing gap” facing teachers (Schmoker, 2006). PLCs are built on Wenger’s (2010) principle of a community of practice. PLCs provide an opportunity for teachers to share their experiences around teaching and learning whilst also reducing the isolation that they might face in the profession. At the core of PLCs is collaboration in developing the knowledge and expertise of teachers (DuFour et al., 2010). By sharing experiences and providing feedback teachers can work together to enhance their collective practice (Roloff, 2012). It is worth noting that PLCs come in many forms including action research teams, study groups and critical friends.

The most effective PLCs provide adequate learning opportunities for teachers through an expansion of their knowledge and development of their practice. They enable teachers to improve their practice based on feedback and reflection whilst creating lessons that best suit

the needs of learners (Wald and Castleberry, 2000). The existing literature provides a range of evidence that shows the positive impact that effective PLCs can have on the teaching profession (Hipp et al., 2008; Schmoker, 2006). For PLC to be effective, there must be an understanding that teachers are experts in their field (Cochran-Smith and Lytle, 2009).

Takahashi & Yoshida (2004) argued that LS is a form of PLC but in an advanced and structured form that puts teachers at the centre. Several features highlighting the importance of learning from colleagues were further highlighted by Hiebert et al., (2002) including teachers' understanding of the learning requirements of their students better than anyone else, teachers' knowledge of which obstacles they face in the classroom and how they are best dealt with in their specific context and collaborating with peers in order to provide an opportunity to share experiences that can be learnt from. Finally, by creating PLC based on teacher expertise, knowledge can be shared amongst colleagues and improvements can be made to the system overall.

4.16 Personal Practical Theories (PPT)

The concept of Personal Practical Theories (PPT) is developed based on teaching experiences such as curriculum design and implementation as well as non-teaching personal experiences and life events (Sweeney et al., 2001). In general, the practices of teachers that impact on their work with students are shaped and/or affected by a wide range of perspectives, experiences, theories as well as key people who have an impact on the life of a teacher (Ross et al., 1992). It has also been argued that PPTs should be refined, reflected upon, improved, and continually adapted based on the experiences of the teacher (Cornett, 2001). Understanding teachers' PPTs may contribute to the provision of an enhanced PD of high quality, provision of student services, and expanded inclusion support (Truscott et al., 2004).

4.17 Towards an International Model of Professional Learning of LS

Takahashi and Yoshida (2004) defined LS as an advanced and structured, high-quality form of a professional learning community. Teachers are at the centre of such PL as it is based on real-life classroom observations and the evaluation is led by teachers amongst peers. The

structure of LS provides an opportunity for teachers to share their experiences and knowledge in a structured way. It is also student-centric as the evaluations are based on the lessons that students receive. Teachers are given agency in lesson studies as they share their opinions on what they have observed and then jointly make decisions on how to improve the learning cycle.

LS is a career-long PD for teachers in Japan. It underpins all content development and reflection for teachers in Japan and many teachers could not teach without LS (Yoshida, 1999). Lewis (2002a) also argued that teachers in Japan believe that best practice is created through LS. The LS process allows teachers to engage in all facets of teaching and learning from text and material selection to lesson structure and content, and evaluation techniques (Watanabe, 2002). Within lesson studies, teachers also work towards longer-term educational goals by focusing on one topic at a time and collectively work to improve its delivery through a specific lesson (Takahashi and Yoshida, 2004). Lewis and Tsuchida (1998) similarly indicated that lesson studies allowed teachers in Japan to create a more student-centred practice.

The studies presented thus far provide evidence that LS is central to PL and the wider teaching culture in Japan. It creates a level of shared values that teachers are familiar with because it is so common across the teaching profession (Watanabe, 2002). Arguably, it has become second-nature for teachers in Japan and teachers have become more comfortable in sharing their experiences and practice and working together to create change and develop the most impactful learning experiences that they can for their student (Watanabe, 2002).

LS is very fundamental to Japanese teaching culture that there is no known translated Japanese research relating LS to student learning outside the country. One of the central researchers on LS, Dr Makoto Yoshida, believes that the Japanese do not necessarily see a need for research into LS as it is a practice that has been ingrained in educational development for over a century in Japan (Yoshida, 1999). It is such a central part of the education culture that there is an inherent understanding that collaboration amongst teachers would support effective learning for students.

4.18 Towards A Theoretical Model of LS

This section seeks to acknowledge and highlight the significance of theories in researching LS and the potential it has on teacher learning. Identifiably, three complementary learning

theories underpin existing and ongoing research on LS, namely, Piaget's cognitive theory (Piaget, 1970), Vygotsky's socio-cultural theory (Vygotsky, 1978), and Lave and Wenger's situated learning theory (Lave and Wenger, 1991). In Piaget's cognitive theory, emphasis is on seeing learning as the sum of changes that occur as a result of the mental actions and/or inactions of the learner influenced by external events and factors (Piaget, 1970). As for Vygotsky's socio-cultural theory, it focuses on the socially and culturally situated nature of learning (Vygotsky, 1972). This theory explains how participation in social interactions and culturally organized activities influences psychological development (Brown et al., 1989). Finally, the situated learning theory as espoused by Lave and Wagner (1991) expands the socio-cultural perspective of learning, describing learning as participation in a community of learners that utilizes specific cultural norms, language, and external representations. Collectively, these three theories provide a solid framework for professional teacher learning and student learning in the context of LS research.

Lewis et al., (2009) created a theoretical model of LS that explores the impact that the approach has on teacher learning. In this model, three main benefits of LS have been highlighted:

- Developing teacher knowledge;
- Improving the use of resources; and
- Building a professional learning community (PLC).

It has to be emphasised here that the researcher does not intend to actively use any of these theories in some way, shape or form as part of this study, but simply to signpost for the readership. The research of Lewis et al., (2009) supported their theoretical model of the three categories for learning within four phases, or stages, through which LS can improve instruction.

4.19 Chapter Summary

The chapter has shown how the evolution of LS as a process in which teachers attempt to develop their teaching methods by working with colleagues to examine and critique their work has been gradual, but persistent. Its spread globally has been dramatic over the last two decades. The chapter indicated that in the Japanese context LS has often been described as comprising three phases, recognising a long-term goal or subject, teaching a research lesson in order to explore the goal, and reflecting on the steps taken (Yoshida, 2002). However, the

reviewed literature suggested that there are cultural peculiarities to these set phases depending on the context ranging from four to eight. This literature review chapter has therefore explored and highlighted the key issues relevant in understanding LS, its origins and adoption outside Japan. The chapter has also explored the concept of teacher knowledge and its types including PCK, tacit knowledge and CK. It is hoped that this will be useful in the triangulation process in the analysis chapter.

Chapter 5 Research Design and Methodology

5.1 Introduction

The purpose of this study is to explore Lesson Study (LS) practices utilised within primary schools in Saudi Arabia using Riyadh region as a case study. The research is going to be based on a mixed methodology of inquiry with the following objectives. Firstly, the aim is to create a set of practical recommendations for the MoE in Saudi Arabia. Secondly, the research aims to explore teachers and school leaders' perceptions about LS as a model of PD. Thirdly, I am especially interested in the extent to which teachers think LS as a strategy of PD has impacted on their CK and PCK and what teachers perceive to be the challenges and benefits of implementing the LS. The study is therefore guided by five main research questions:

- 1) What are primary school teachers and school leaders' perceptions of the impact of LS on developing content knowledge of Maths, Science and Arabic?
- 2) What are primary school teachers and school leaders' perceptions of the impact of LS on developing pedagogical content knowledge of Maths, Science and Arabic?
- 3) How does participation in LS influence school-based collaborative learning communities?
- 4) What are the perceived benefits of implementing LS in primary school context?
- 5) What are the perceived challenges in implementing LS in primary school context?

In order to respond to these questions, the aim is to explore LS in complex and creative ways, not merely seeking to measure outcomes. The plan is to utilise a methodology that will help me to study the subjective experience of teachers and school leaders directly in their natural settings. The next section presents the philosophical assumptions and research paradigm (that is, claims to knowledge), the methodology (that is, methods and strategies that connects to results), and data collection methods (that is, ways and steps of analysis).

5.2 Philosophical Assumptions and Research Paradigm

Willis (2007) defined a research paradigm as, ‘... a comprehensive belief system, world view, or framework that guides research and practice in a field’ (p.8). Maxwell (2011) described paradigms as tools to provide a more in-depth understanding of the phenomena being studied. Essentially the philosophical assumptions and research paradigm guides the researcher in the planning, implementation, analysis and interpretation of the research (Guba and Lincoln, 1994; Terre Blanche and Durrheim, 2006). Broadly, three common orientations exist, namely: epistemology, ontology, and methodology (Gray, 2009; Denzin and Lincoln, 2011). Furthermore, the terms ‘positivist’, ‘interpretive’ or ‘critical’ have been used in describing pieces of research based on the methods (Merriam, 1998; Henning et al., 2004). The ontological, epistemological and methodological assumptions underpinning this study are explained below.

5.2.1 Ontological Assumption

Ontological assumptions deal with the nature of the reality of the subject that is being researched (Denzin and Lincoln, 2011; Neuman, 2011; Creswell, 2013). Ontological assumptions shape what counts as knowledge (Pascale, 2010a), or considered as credible knowledge (Lincoln and Guba, 2013). It has been suggested that there are two traditional contrasting ontological positions, namely, the positivist versus the interpretivist positions (Neuman, 2011). Positivists argue that the world exists “out there” (Neuman, 2011). Reality is external or independent of the mind (Bryman, 2012). Positivists; therefore, engage in social research using research methods and procedures that are known and applied in the natural sciences (Mertens, 1998). The positivists’ ontological position suggests that the researcher should keep in mind that knowledge is objective, hypotheses can be tested, and statistical inferences are used to generalise findings to wider groups (Guba, 1990; Guba and Lincoln, 1994; Neuman, 2011).

Due to the aims and objectives of this research, this ontological position was considered not appropriate for this study to provide comprehensive understanding of LS in primary school context in KSA for several reasons. Firstly, this study was conducted in a school or classroom context which needed subjective interpretations rather than numeric descriptions. Creating controlled situations to study a specific variable at a time was impossible.

Therefore, this study did not intend to isolate and control variables. Secondly, this study aimed to understand, describe and interpret the beliefs, values and assumptions of the research participants rather than predict and test a hypothesis. Thirdly, since the researcher was the instrument which generated data, it was not feasible to observe an event in a school or classroom environment in a neutral way without either influencing it or interacting with it. Finally, it was not the intention of this researcher to generalise the findings to a larger population. Therefore, using interpretivist research was considered.

The interpretivists' position, in contrast, supposes that reality is constructed through interpretations which are influenced by culture, personal experience and worldviews (Neuman, 2011). Ontologically, this position suggests that the only reality a person can know is the reality of his/her own experience (Kilpatrick, 1987). It is also understood as a, "systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (Neuman, 2011, pp. 101-102). This ontological position acknowledges multiple realities and mental constructions – that is, reality is subjective and different people construct different realities based on their intentions, beliefs, values and reasons (Mertens, 1998; Neuman, 2011; Henning et al., 2004). The interpretive ontological position also makes the researcher intrinsically part of what is being studied or observed and takes a more interactive and subjective role (Neuman, 2011). The interpretivist assumptions, therefore, appeal to the aims and objectives of this study since the focus is on the subjective perceptions and experiences of the research participants in using the LS model in teaching particular subjects in KSA. It is assumed that the interpretive ontological position will provide appropriate opportunities to understand, describe and interpret the effects of LS on the research sample, and provide understanding of the complex contextual and social characters of education such as teacher development in KSA. This ontological position can be adopted in a mixed method research study.

5.2.2 Epistemological assumption

Epistemology is a field of philosophy that is interested in gaining knowledge and it concentrates on what the researcher can know about the world and how he/she can know it (Gray, 2009; Denzin and Lincoln, 2011; Neuman, 2011). The researcher, with the viewpoint of a positivist, keeps a distance from what is being observed. Knowledge acquisition is

objective (Bryman, 2012). In contrast, the interpretivists assume that knowledge is acquired via observation, interpretation, and reflection influenced by complex values, beliefs, and assumptions (Denzin and Lincoln, 2011; Neuman, 2011). From the epistemological viewpoint, therefore, this study is situated within an interpretive or constructivist paradigm and acknowledges that truth is subjective and value laden. Constructivism is an approach in which social reality is considered to be relative to the individual and the context in which they find themselves (Lincoln and Guba, 2013). In other words, reality is considered to be constructed, and the goal is to understand a particular context (Willis et al., 2007). From this perspective, knowledge and its creation are seen as a product of a cultural community (Pascale, 2010b). Constructivism can also be seen as a continuum between the individual and a social context (O'Donnell, 2012).

The interpretive or constructivist paradigm was a suitable choice because the purpose of this research is to investigate, understand, describe and interpret the perspectives of teachers and school leaders about LS models in selected primary schools in Riyadh. Secondly, the interpretive paradigm is suitable for understanding the social characters of education, like the professional development of teachers. Thirdly, it enables the researcher to understand the participating teachers' experiences of the LS model and how their school leaders supported and supervised the LS model. Thus, this research seeks to explore the understanding of the participants (teachers and their school leaders) and their subjective experiences of implementing the LS model. In this way, the constructivist approach seems to recognise the agency of the research participants and views them as co-constructors of knowledge (Lincoln and Guba, 2013).

5.2.3 Methodological Assumption

In simple terms, the methodology of a research describes the way the researcher acquires understanding and gets the desirable knowledge (Gray, 2009; Denzin and Lincoln, 2011; Neuman, 2011). There are two main schools of thought, namely, quantitative and qualitative approaches. While quantitative research essentially employs deductive or experimental methods that concentrates on verifying a hypothesis, qualitative research employs inductive approaches such as interviews, observations and document analysis to generate theory (Gall et al., 2007). There is a third option that uses both the quantitative and qualitative approaches hoping to take advantage of their strengths and minimise their weaknesses. This third option is often called the mixed method approach. Given that this is a case study in four schools in

Riyadh aiming to investigate, understand, describe and interpret the views of principals and teachers about the LS model, it appears the mixed method will best suit the needs of this research. The study does not aim to test a theory or hypothesis; nor does it seek to generalise the findings. Instead, it seeks to particularize the findings to the Saudi context. Table 5.1 compares the different philosophical positions and their associated research paradigms based on Neuman (2011), Bryman (2012) and Lincoln and Guba (2013).

Paradigm	Orientations		
	Ontology	Epistemology	Methodology
Positivist	There is a single reality that can be observed and measured The focus is on predicting and controlling Believe in cause-effect relationship	Objective Observer is detached from what is being observed Value-laden	Deductive Experimental Hypothesis testing Quantitative
Interpretive	Multiple realities The focus is on understanding what is happening	Subjective Observer is part of what is being observed Value mediated	Inductive Interpretive Qualitative
Critical	There are multiple realities which are shaped by social, political, cultural, economic, ethnic, and gender values	Subjective Observer constructing versions Value mediated	Participatory Emancipatory Qualitative

Table 5-1 The three philosophical positions and associated paradigms

5.3 Research Design – Case Study Design

Yin (2018, p. 28) defined the research design as a plan which guides the research process starting with defining the research questions, detailing the steps for collecting and analysing data and ending with defining the conclusions of the study. For the purposes of this research, the case study approach was considered. This strategy is widely recognised in the social

sciences, for conducting in-depth research and enabling researchers to examine data closely within a specific context (Yin, 2018). In essence, case studies investigate and explore current real-life phenomenon, through an in-depth, detailed contextual study, of a restricted number of events, and their relationships (Rosenberg and Yates, 2007). In many cases, a case study is conducted in a small geographical region, with a limited number of individuals who act as the subjects of the research (Yin, 2018; Crowe, et al., 2011; Zainal, 2007). Although some case study approaches are either quantitatively or qualitatively orientated, those who support the case study approach promote employing quantitative and qualitative methods within their designs (Merriam, 1998/2009; Miles et al., 2014; Stake, 1995; Stewart, 2014; Yin, 2018). As this research is focused on understanding teachers and school leaders' perceptions of LS implementation in four primary schools in Riyadh region using both qualitative and quantitative methods, the case study approach fits the aims of the research well.

Although many scholars have attempted to define what constitutes a case study research design, the most commonly accepted definitions are that of Yin (2018), Stake, (1995), and Merriam (1998). According to Yin (2018), "a case study research is the scope, process and methodological aspects of case study research, highlighting that the nature of inquiry is verifiable by observations, or experiences (rather than by a theory or logic), and stresses the importance of the context, to the case." In contrast, Stake's (1995) approach is more flexible, and though concerned with attention to detail in the process, maintains that the focus should remain on the phenomenon being studied, as opposed to the method in which it is being studied. Stake (1995) further suggested that case study research is the investigation of the 'complexities' and 'particularities', concerning a single case, and aims to understand its activity in important 'circumstances'. Similarly, Merriam (1998) highlighted the defining characteristic of case study research as the object being studied (the case/bounded system) emphasising that case study investigation centres on a distinct thing, and the product of the analysis should be heuristic and descriptive in nature. In addition to this, Merriam (1998), included the phenomenon being studied and the products of the investigation in her definition of a case study, which she described as an in-depth "description and analysis of a bound system". The above-mentioned educationalists provided three distinct definitions for case study research. However, since the research seeks to explore the perspective of teachers and school leaders about the impact of LS on their teaching and classroom practice, this study is considered to be an exploratory case study and closer to the definition of Yin (2018) as stated above.

Denscombe (2010, p. 54) identified the following characteristics of the case study research which guided the design of this study:

- It emphasizes depth of study rather than breadth of study.
- It emphasizes the particular rather than the general.
- It emphasizes the relationships/processes rather than outcomes and end-products.
- It emphasizes the holistic view rather than isolated factors.
- It emphasizes the natural settings rather than artificial situations.
- It emphasizes multiple sources rather than one research method.

Although case study is a familiar and common term, there are divergent views about its nature and usage (Yazan, 2015). Yin (2018) described the case study as “an empirical method that investigates a contemporary phenomenon (the “case”) in depth and within its real-world context” (Yin, 2018, p. 15). This definition shows that using the case study approach is an appropriate option when there is a need to examine a phenomenon in depth, which is needed in this present study. Furthermore, Yin (2018, p. 23) pointed out that a case study is appropriate when “the boundaries between phenomenon and context are not clearly evident”. Stake (1995) and Merriam (1998) indicated that boundary is the most significant characteristic of case study. In this research, the coherent group of primary schools in Riyadh area under examination define the boundedness of this study.

Stake (1995) categorises case studies as intrinsic, instrumental or collective. Intrinsic case study is used when the researcher aims to understand the “particular” case in question (Stake, 1995, p. 3). The attempt to identify themes and patterns and compare these with other cases to understand the case is referred to as instrumental case study (Stake, 1995). Collective study is used when the researcher requires the research to be conducted using multiple-case studies (Stake, 1995). The type of this research is an instrumental case study as it focuses on getting deeper understanding of teachers and school leaders’ perceptions of LS in KSA based on one case, that is, the group of primary schools in Riyadh region. Since male and female teachers work in separate schools in the Saudi educational system, this study is based on four separate schools, two for male teachers and two for female teachers, in order to obtain breadth of understanding.

The case study approach has several advantages including its ability to allow a closer engagement with the research participants (Mynott, 2017) and facilitating the development of a richer and deeper understanding of the subject matter by allowing the research patterns

the needed time and space to share their stories (Ceppi-Bussmann, 2006). The case study approach enables the researcher to present a rich contextual description, and allows for the investigation of a phenomenon which pervades multiple levels of a system – particularly where there are no clear boundaries between the phenomenon and context. This approach also helps to examine interaction across organisations, groups, individuals, and settings (Bocala, 2014). Furthermore, according to Zainal (2007) and Yin (2018), the case study approach allows for the examination of the data, often, in the context within which it is used; variations (in relation to intrinsic, instrumental and collective approaches) to case studies offer the benefit for researchers to conduct both quantitative, and/or qualitative analysis of the data. The detailed qualitative data produced during the process helps to explore and describe the findings in real-life environments and can help explain the complexities of those real-life/real-time situations, which are unlikely to be captured through other methods (Zainal, 2007; Yin, 2018).

There are, however, known limitations of the case study approach which include allowing for particularization and inability to generalise the research outcomes (Stake, 1995) and producing large amounts of data which may be difficult to manage (Zainal, 2007; Yin, 2018). What it means for this research study is that the outcome may only be reflective of Riyadh. However, the research outcome is likely to aid the development of LS activities throughout Saudi Arabia and similar contexts where there are commonalities in terms of culture, religion, geography, politics and language. More importantly, the reasons for implementing this research in four schools is not to generalize the findings to a larger population, but to gain different views of teachers who work in various settings. Creswell (2013) indicated that the matter of generalizability has little significance in qualitative case study research methods because the sampling steps used in qualitative research do not support it. It can be argued that difference and diversity are more applicable in qualitative research than similarity and generalizability.

Yin (2018) pointed out that based on the nature of the analysis used in case study research, it can be either holistic or embedded. He identified a holistic case study that covers one unit of analysis, while an embedded case study covers more than one unit of analysis (Yin, 2018). A unit of analysis is the entity of interest, and it could either be individual, group, program, social situation, organization, phenomena, event, or process (Harrison et al., 2017). Therefore, this study is deemed as a holistic case study with a group of primary schools as its unit of analysis.

Yin (2018) stated that the kind of research question is another standard that decides any research methodology. He pointed out that the “how” and “why” questions are exploratory in nature and are connected for use in case study. He also asserted that when research questions are framed as “what” questions as in the case of this study, two possibilities arise. The “what” questions can be either exploratory questions or different types of “how many” or “how much” questions. The “what” questions of this research are exploratory in nature and aim to explore primary teachers’ experience of LS, as indicated by Yin (2018, p. 10). Thus, this study is an exploratory case study.

In summary, a single holistic exploratory case study design was used to conduct research in four purposefully selected primary schools in the Riyadh region in order to explore teachers and school leaders’ perceptions about LS and its impact on CK, PCK and building collaboration among teachers.

Figure diagram 5.1 below shows the framework for the research design for this study.

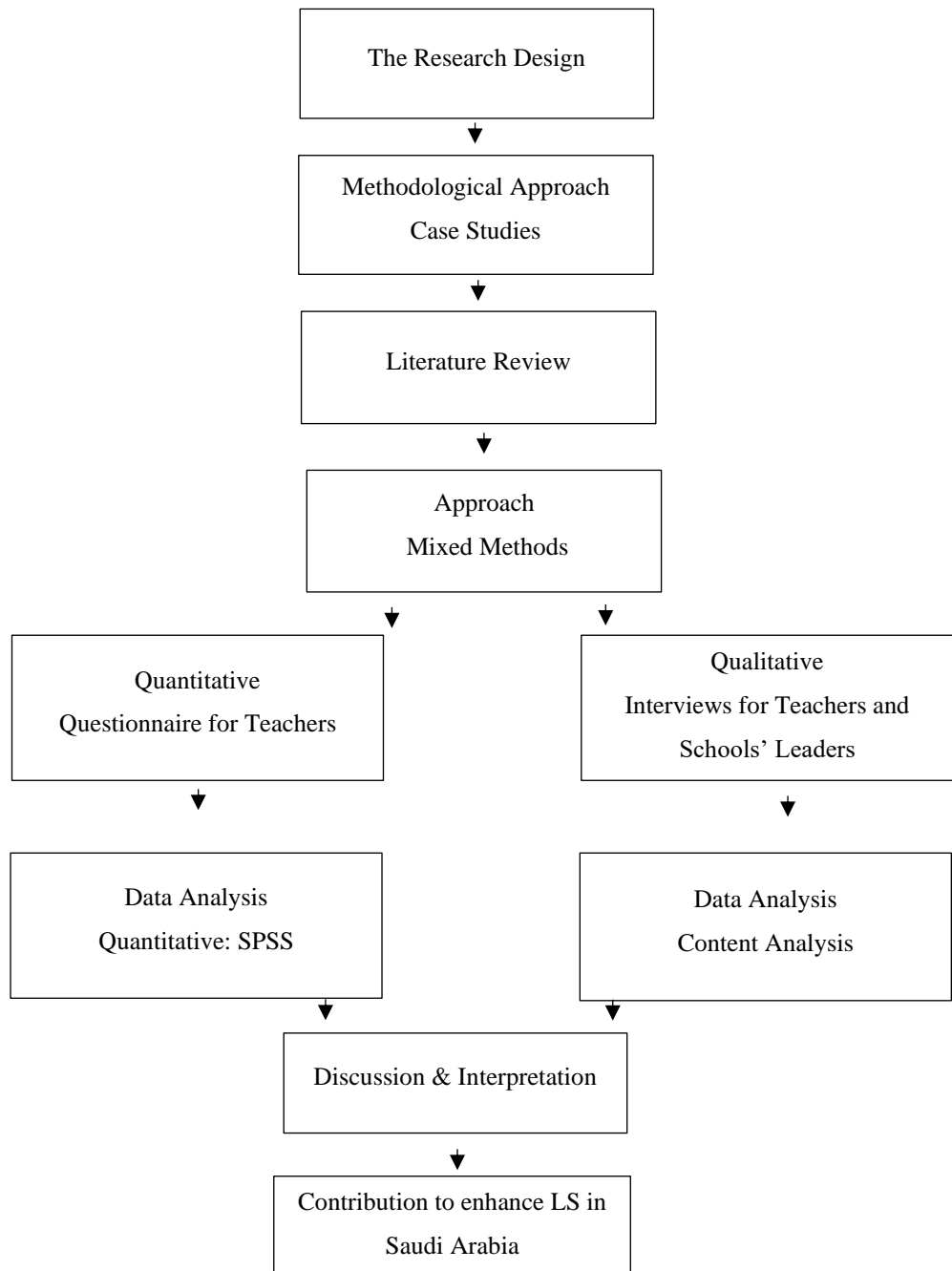


Figure 5-1 The research design framework.

5.4 Mixed Method Research

Punch and Oancea (2014) defined mixed method research as an "empirical research which involves the collection and analysis of both qualitative and quantitative data," (p. 551). In this research, researchers aim to expand the breadth and depth of understanding through collecting and analysing data using the elements of both approaches (Johnson et al., 2007).

Although the qualitative and quantitative research methods were traditionally used independently, researchers found that the collective uses of the two approaches allowed for more validity in redefining and reflecting the nature of social reality (Pinto, 2010). Following the objectives of this study (see Section 1.2), it was considered that using a mixed method approach would be most effective for achieving the research objectives. It was identified that the mixed-method approach has the following strengths. First, the mixed-methods approach is considered complementarity in nature (Collins et al., 2006). This means that to understand the phenomenon under investigation, two different approaches are combined to investigate the different aspects of the phenomenon and gain detailed understanding (Collins et al., 2006; McKim, 2017). In this study, the questionnaires used facilitated gaining an overview of common issues and practices on LS from a large sample of teachers, while the interviews facilitated examining teachers and their school leaders' perceptions of the degree to which involvement in LS had an effect on their CK, PCK, and collaboration in greater depth.

The second advantage, the mixed-methods approach allows gaining wider interpretation and understanding of the phenomenon being addressed (Collins et al., 2006). For instance, in this study, the quantitative questionnaire explored teacher perceptions of the degree to which involvement in LS had an effect on their CK, PCK, and collaboration. In addition, data from the qualitative interview further examined how the LS model impacts teachers' learning based on the views of teachers and school leaders. Thus, the mixed-methods approach in the current study would help answer the research questions comprehensively and provide deeper understanding of the teaching and learning process while examining the experiences of teachers and their school leaders about LS implementation and its impact on teachers' learning.

Third, the mixed-methods approach seeks to achieve triangulation, that is, different methods are used to examine the same phenomenon in order to achieve corroboration and convergence (McKim, 2017). In this way, the mixed-methods approach may assist the researcher to identify similarities and contradictions which exist within the data (Johnson et al., 2007). It is important to note that in this study, the mixed-methods research was used to achieve complementarity and corroboration.

In view of all that has been mentioned so far, the normative assumption of the mixed-methods approach is that data from qualitative and quantitative methods are not incompatible in social research (Creamer, 2017). There is therefore a value addition through the

combination of both qualitative and quantitative approaches in a single research project because of the likelihood of producing more robust findings (Creamer, 2017). Furthermore, the corroboration of multiple types of data or multiple data points enhances validity (Yin, 2018). For example, the quantitative data can be beneficial for making generalizations in cases where a large random sample of a population is studied while the qualitative data gives the research in-depth and rich insights regarding the feelings and perceptions of people and communities (Pinto, 2010). In the specific case of this study, the researcher used close-ended questions in the survey instrument and semi-structured interviews.

However, as Bryman (2012) pointed out, the study which uses mixed methods approach is not considered more inherently superior to the one which uses a single approach. Similar to studies employing a single method, mixed methods research could be poorly designed and carried out. Therefore, the mixed method approach could be limited in a number of ways. For example, mixed method studies are deemed challenging to justify, plan, implement and integrate the quantitative and qualitative findings (Bryman, 2012).

Finding qualitative experts who can easily discuss quantitative analysis and vice versa can be challenging (Hibberts and Johnson, 2012). Another challenge is making sure that there is adequate quality of each component of a mixed method approach given that each method must follow its set standards for rigor (Wisdom et al., 2011). For example, compared to qualitative analyses, quantitative analyses need far larger sample sizes to get statistical significance, which require meeting goals of saturation and relevance. Finally, mixed methods studies require intensive work and greater resources and time than those needed to conduct a single method study (Bryman, 2012). The strengths and weaknesses of the mixed research method are presented in the Table 5.2 below.

Strengths
<ul style="list-style-type: none"> • Words, pictures and narratives can be used to add meaning to numbers. • Numbers can be used to add precision to words, pictures and narratives. • It can provide fuller, deeper, more meaningful answers to a single research question. • It can link theory and practice to generate practical theory. • The strengths of an additional method can be used to overcome the weaknesses in another method.

<ul style="list-style-type: none"> • Convergence and corroboration of findings can enhance evidence of a particular claim • Triangulation (multiple information sources) becomes possible. • Divergence and additional findings can provide insight and broader understanding that will be missed when only a single method is used. • Quantitative sampling approaches can be used to increase the effectiveness of the generalisation of qualitative results. • Combining quantitative and qualitative research produces integrated, varied multiple knowledge.
Weaknesses
<ul style="list-style-type: none"> • It is difficult for a single researcher to understand and effectively conduct both quantitative and qualitative research; it might require a research team. • The researcher must understand multiple methods and approaches and how to mix them appropriately. • Methodological 'purists' contend that one should always work within a single paradigm. • It is more expensive and time consuming. • There are challenges in balancing/assessing the outcomes of qualitative and quantitative data analysis at the interpretation and theorisation stages.

Table 5-2 Strengths and weaknesses of mixed research (Hibberts & Johnson, 2012, p. 126).

5.5 Methodological Triangulation

Triangulation in research can be achieved using different forms – the most popular forms are data triangulation, theory triangulation and method triangulation. Data triangulation involves the comparison of data collected using the same method but from different sources at varying times, contexts or by different researchers in a study (Greyson, 2018). Theoretical triangulation entails the use of more than one conceptual framework or theory in the interpretation of a research study with the view to gaining greater insights (Ellis, 2016). Method triangulation is seen as the most common form of the three and involves the use of at least two methods or two designs to examine an event or problem (Wijnhoven and Brinkhuis, 2015). Methodological triangulation can be either, within-method, that is, using

multiple techniques within a given methodology such as focus groups and archival analysis (Homburg et al. 2012) or between-method triangulation, that is, using different methods such as a survey and semi-structured interviews (Miles and Huberman, 1994).

In this study, the data from the questionnaires was used as the basis for discussion and triangulated with the views expressed in interviews as well as views expressed in the existing literature. Reasons for using triangulation included to neutralize the potential biases inherent in each research method (Creswell, 2009) and to explore sameness and/or differences of the same concepts under the different methods (Creswell and Clark, 2011). Although there are different types of triangulations, methodological triangulation was used this study. As mentioned above, this type involves the use of more than one method, for example interviews and questionnaires, to collect data in order to understand the research topic deeply and enhance the credibility of the results (Flick, 2004). Furthermore, methodological triangulation is seen as the model that allows for the use of two different methods (quantitative and qualitative) in an attempt to confirm, cross-validate, or corroborate findings within a single study (Morgan, 1998). It is also argued that methodological triangulations allow each method to strengthen and develop each other while increasing validity, objectivity and reducing bias at the same time (Creswell, 2009).

This study relied on between-method triangulation – that is, qualitative (semi-structured interview) and quantitative (questionnaires) (Fielding, 2009). Between-method triangulation is often perceived as a powerful research technique that supports validation and credibility through the cross verification of the results from more than one source (Renz et al., 2018; Wijnhoven and Brinkhuis, 2015). The rationale for using between-method triangulation was that the use of more than one method provides a means by which the benefits of quantitative and qualitative components of the research are integrated, thereby, compensates for the weaknesses in both methods (Myers, 2016). In practical terms, between-method triangulation allows for the integration of data from both quantitative and qualitative components within a particular piece of research. For instance, quantitative studies often lack detail whereas qualitative data tends to be detailed. Triangulating the two sources of data ensures getting “objective facts” from the quantitative data at the same time ensuring that the findings provide enough details (Kheir et al., 2017). Others have also argued that between-method triangulation of findings enhances the generalizable of such findings

(Bryman, 2008 Kheir et al., 2017). Furthermore, between-method triangulation also allows a comparison of perspectives to strengthen the findings of a study (Hesse-Biber, 2010).

Methodological triangulation is considered concurrent when the data collection process happens simultaneously during the research study. This means that during the research process, the researcher collects and analyses data at the same time and the results from the two sets of data are combined to provide comprehensive interpretation. Priority was not given to either method, but they were both given equal opportunity right from the data collection phase to the analysis phase. At the data analysis phase, the convergence of the findings was explored as a way to strengthen the knowledge claims of the study. Other times, divergence was explored.

Strengths

Creswell (2014) suggested that the main benefits for engaging in the collection of data concurrently include the following:

- a shorter data collection time compared to sequential designs
- results can be easily validated and substantiated
- less time-consuming than sequential procedures

Andrew and Halcomb (2012) argued that the strategy allows for the cross-checking and validation of findings which increases the depth and quality of the results. It also allows for the collection of in-depth data, increases the confidence in the research outcomes as well as enables different dimensions of the problem to be explored (Jones and Bugge, 2006). The strategy also helps to improve the consistency and accuracy of data by providing a holistic picture of the phenomenon (Roberts and Taylor, 2002; Jones and Bugge, 2006).

Weaknesses

Creswell (2009) also suggested the following weaknesses:

- difficulty involved in collecting data on the same phenomena at the same time with two separate methods

- difficulty comparing results using two different methods and addressing differences that may arise in the results
- requires great effort and expertise to study a phenomenon appropriately.

5.6 Sampling and Research Sample

This study took place in four purposefully selected primary schools (two for males and two for females) out of the twelve primary schools in the Riyadh region where LS as a school-based model of PD is being implemented. Statistically, the region has an estimated 1941 elementary schools for boys with 37053 male teachers; and 2640 schools for girls with 48101 female teachers (Saudi Ministry of Education, 2014). Riyadh is selected because it is the largest educational region in Saudi Arabia where all educational projects are piloted by the Saudi Ministry of Education. Because the city is closer to the central office of the Saudi Ministry of Education, it is easily accessible to supervisors. In addition, the city enjoys sufficient resource allocation: both material and human resources. Riyadh is therefore chosen for the above reasons. In addition, the researcher hails from Riyadh and will be able to access schools and the research population relatively more easily. Principals have been included to gain an understanding from the perspective of school leaders who have been given the responsibility for implementing LS in their schools, to aid the PD of teachers. Similarly, school teachers are also important actors who implement and are responsible for the level of effectiveness of LS. It is expected that their inclusion can provide valuable data that will contribute to answering the research questions. The schools were selected based on the criteria detailed below:

- The school has a minimum of 10 teachers who are using LS.
- It has implemented LS at least in the previous year and is continuing to use it.
- It provides at least one training programme about LS.
- It implements LS in its school with the approval of the Saudi Ministry of Education.

The population of this study included mainly primary school teachers and school leaders. Teacher participants were selected based on the following criteria:

- Current full-time teachers at the four selected primary schools.
- Participate, currently, as a LS member in all LS processes.
- Have attended a training programme about LS - at least one programme before he/she participated in LS processes.

- Willingness to participate in this study.
- Minimum of one year of using LS experience required.

In terms of the sample size, the survey involved all teachers who participated in LS in the four selected schools and were willing to participate in the research. The sample size for the interviews, on the other hand, was made up of the principals of the four selected schools and 12 teachers across the four schools.

5.7 Research Instruments

The research was conducted using both semi-structured interviews with school leaders and teachers at primary schools and a questionnaire survey distributed among teachers in the research schools. Therefore, both a qualitative and a quantitative approach were employed. This corroboration was aimed to strengthen reliability through the use of various data sources. It helped the researcher to identify common themes and differences once the data from the research was compiled and analysed. In this next section, the data collection tools used are explained in detail.

5.7.1 Survey

A survey is selected as a data-collection method because while surveys are generally considered to be quantitative methods, they do provide corroboration and evidence to support data and findings from qualitative methods such as focus groups and interviews. Although the focus groups/interviews are likely to provide richer, more in-depth data, the survey and questionnaire are appropriate means of collecting data from a larger group of participants. The close-ended questions allow for a means of quantitative analysis of the Likert ratings. Furthermore, survey through the use of questionnaires removes interviewer bias and enhances the chances of having an anonymized data unlike interviews and focus groups where the research comes face-to-face with the research participants. The use of questionnaires also allows respondents sufficient time and space to answer the research questions, and they provide greater uniformity across answers because each respondent answers the same question (Mills et al., 2010). In this study, the online survey was largely used to determine whether or not, and in what way(s), teachers believe LS has impacted the work they do. In order to better enhance the quantitative findings from this study, a larger sample size will be used to better utilize the statistical procedures available for analysis.

A survey is used in this study to collect data from the teachers. The aim is to invite all teachers involved in LS from the four selected primary schools to complete the survey via email. The email will include a link to the questionnaire on SurveyMonkey (an online survey development cloud-based software service company), with a guide requesting that those willing to participate access the survey online. SurveyMonkey makes it possible to secure the participants' anonymity merely by choosing not to gather computer IP addresses. The use of the SurveyMonkey also guarantees the privacy of all research participants (Knussen and McFadyen, 2010). In terms of design, the questionnaire was designed to include five sections, each section with a specified number of items. Overall, the number of items under each section was adapted from existing research alongside guidance in the Saudi Teacher Guide (2012). For example, in the case of PCK, the researcher relied on the work of Shulman (1986) who was the first to propose the use of the following six items:

- Using Active Learning Strategies in Teaching
- Employing Technology in Teaching
- Providing Students with various learning methods
- Using various and multiple formats for evaluation
- Using Alternative Teaching Strategies for students with learning disabilities
- Understanding how students learn the subject I'm teaching

However, the researcher also had to ensure that it met the national guidance provided by the Saudi MoE under the Teacher Guide (2012) which was to facilitate understanding by the research participants. Similar checks were carried out for the other sections. Table (5.3) below outlines the sections of the questionnaire, the dimensions they seek to cover as well as the number of items under each section.

Sections	Dimension	No. of Items
Personal information	The data collected from this section supports identification of the differences between teachers' perspectives towards specific characteristics of the case study such as gender, age, experience, specialization, educational level and experience in using LS model.	6
Impact of LS on teachers' CK	Teachers' perceptions regarding LS impact on their CK.	5

Impact of LS on teachers' PCK	Teachers' perceptions regarding LS effect on their PCK.	6
Does LS build a collaborative learning community?	Teachers' perceptions regarding LS effect on the effectiveness of cooperation among teachers.	6
LS benefits for teachers	Teachers' perceptions of the benefits of LS.	7
LS challenges for teachers	Teachers' perceptions of LS challenges	9

Table 5-3 Questionnaire sections and dimensions.

Surveys were administered through SurveyMonkey and will be analysed using SPSS. Both instruments were designed to focus on the themes identified from the research questions in order to ensure that data was cross-verifiable using methodological triangulation (Creswell, 2009). This should also help to gain a clearer understanding of the phenomenon, and to ensure that findings are as reliable as possible (Creswell, 2013).

The questionnaire was made up of just under 36 questions based on the key themes of the study, which also correlated with the research questions. These were answered based on a five-point Likert scale. Although the questionnaire was designed in English, it was administered in Arabic for two main reasons. Firstly, it ensured that the research participants fully understood the questions. Secondly, it offered them the opportunity to express themselves in their first language. In order to ensure clarity of the intended meaning, the questionnaire was professionally translated by two different bilingual academics who agreed on an Arabic version.

5.7.2 Semi-structured Interviews

A semi-structured interview format was used to interview the participants. This meant asking each research participant (teachers and principals) the same main questions, with necessary follow-up questions to extend the interviewees' responses and delve deeper to explore their personal experiences (Arthur & Nazroo, 2003). In addition, the semi-structured interview questions were open-ended to encourage the participants to express their authentic experiences unrestricted (Creswell, 2014). The advantage of semi-structured interviews and an open-ended questioning style was that it permitted enough structure for each interviewee to follow similar, yet styles unique to them, while also providing enough leeway to ensure

the interviews would be conversational (Creswell, 2014). It also offered opportunity for the research participants to share their experience free from bias caused by the researcher's personal expectations (Moustakas, 1994). In practical terms, 4 school principals were interviewed along with 12 primary school teachers. Because schools in Saudi Arabia are gender-segregated, interviews were considered most suitable for the needs of this research rather than observation and other instruments like CoRes (Content Representations) and PaP-eRs (Pedagogical and Professional-experience Repertoires) because the researcher will not have had the opportunity to interact with female participants face-to-face. Interviews with female participants were therefore conducted by phone.

5.8 Data Saturation

The debate regarding the use of the concept of saturation in determining the sample size or number of research participants in qualitative research has been robust and enduring. For instance, Boyd (2001) considered 2-10 participants or research subjects to be sufficient to reach data saturation. Creswell (2013) also recommended having lengthy interviews with up to 10 research participants in order to reach data saturation. Other researchers suggested that data saturation is achievable with as few as 6–12 research participants or sample size (Guest et al., 2006; Ando et al., 2014). Guest et al. (2006) also argued that if research is concerned with a shared belief, behaviour, or perception of a relatively homogenous group, having a sample of 12 will lead to saturation. Yet, Adler & Adler (2011) recommended the use of samples between 12 and 60 in order to achieve data saturation. Saturation therefore appears to be the most commonly used criterion for selecting sample size or number of research participants in qualitative research. In terms of a definition, the concept of saturation typically means information redundancy or gathering data until no new information is generated (Gershgoren et al., 2016). In this study, a total of 4 school leaders and 12 teachers were interviewed. The common denominator was that all research participants were involved in using LS in one way or the other – teachers were using it in their teaching and school leaders were supervising the use LS in teaching and learning.

5.9 Limitations of the Research Design

One limitation of this case study design is that the results will only pertain to 4 out of the 12 schools in the Riyadh district (which are among 54 schools across Saudi Arabia)

implementing LS as a teacher PD strategy (Merriam, 2014). Unfortunately, the researcher cannot estimate the behaviour of future teams known to participate in LS by collecting data, but he/she can use it to assist in more extensive data collection of analyses of educational and pedagogical ideas for improving instructional teachers (Creswell, 2014). Concurrent triangulation will be used to balance bias through the analysis of the quantitative and qualitative data, seeking to highlight points of convergence, divergence and complementary views (Creswell and Plano Clark, 2011). The use of questionnaires to collect data from teachers and semi-structured interviews with teachers and school leaders was considered ideal to gathering sufficient data that would help answer the research questions.

In order to ensure validity, the study relied on concurrent triangulation to establish internal validity by utilizing multiple data sources to be incorporated into the data analysis stage of this research (Creswell, 2014). External validity describes, “the degree of similarity between the research site and the other sites as judged by the reader” (Lodico et al., 2010, p. 173). For this research, all the questionnaires and interview transcripts will be stored with the data analysis records for future review. Moreover, external validation of the data will be performed to permit teachers and school leaders to consider how the PLC (through LS model) impacts practices. Other researchers will be able to use the findings of this study to monitor and evaluate other similar situations to guide future decisions about the use of LS strategy as a successful PD model.

Regarding the issue of reliability, the aim of reliability in a case study, as Yin (2018) suggested, is to ensure that, “if a later researcher follows the same procedures as described by an earlier researcher and conducts the same study over again, the later investigator will arrive at the same findings and conclusion,” (p. 46). In consideration of this, to reduce potential error from bias, two different data collection tools were applied as described above. Although the questionnaires for teachers include closed-ended questions only, the researcher will follow up the semi-structured interviews to ensure a more accurate and in-depth understanding of the data. The study included all members of the possible research population at the four selected primary schools in Riyadh region, and generalizability is not intended. The sample comprises individuals of both genders from a wide variety of disciplines, school positions and roles. Furthermore, the reliability of the questionnaire will be verified by evaluating internal consistency, and the sample population for the qualitative data tool (semi-structured) will be drawn from two different groups within schools (teachers

and school leaders) to afford access to understanding different perspectives and views of the LS model.

5.10 Research Ethics

Ahead of my fieldwork, I received ethical approval from the Ethics Committee at the University of Glasgow. The two main ethical considerations in this research include informed consent and confidentiality. In terms of informed consent, all potential participants were provided with an information pack about the study and their written and signed consent obtained before participation. In practical terms, all the research participants were given a consent letter that contained an overview of the study with information highlighting the objectives of the study, as well as the duration of the interview if they chose to participate. The consent letter also informed the research participants that there were no apparent risks associated with the research. Participants were required to sign and return the form prior to the start of the study, and participants were informed that they may withdraw from the study at any point in time. Therefore, each participant in this study was given the opportunity to give their informed consent prior to the research in order to ensure credibility and honesty, and to guarantee that the data collected has been gathered freely from participants (May and Luth, 2013). The researcher encouraged participants to be honest and open while ensuring the data collection process takes place in a safe and comfortable environment. The researcher used audio recordings and transcripts to verify the reliability of the recorded data collected during the interviews (Benatar et al., 2012).

In terms of confidentiality, all data will remain confidential. Pseudonyms are used in presenting the findings, and no specific details that could identify any person or group are used in order to maintain confidentiality and anonymity. The areas in which they work are also kept private. No identifiable information related to the participants (such as links to schools or districts) are included in the research. A password-secured laptop was used to store recordings, type transcripts, and electronic files that contain private or coded information. Finally, a secure electronic storage device was used to save back-up copies.

Chapter 6 Analysis of the Quantitative Data

6.1 Introduction

Data analysis in a mixed method research poses some challenges regarding the handling of the two data sets in many ways (Creswell, 2013). However, the data in this research are complementary to each other and although analysed separately, the findings are to be interpreted and presented together in the discussion chapter. The presentation here is done using mean, standard deviation in tables and percentages using pie charts, which describe each sub-scale items. In addition, both t-test and One-way ANOVA are used to analyse the quantitative data.

This chapter presents the analysis and results of the LS Questionnaire used for this study. This questionnaire was used to explore the perceptions of teachers in applying the LS Model for teacher PD. Given that the methodological processes of data analysis were discussed in the previous chapter, this chapter focuses on analysing the quantitative data. Specifically, this chapter concentrates on reporting the views of teachers on how they apply the LS model as the approach of choice for teacher PD. It also identifies the perceived impact of this model upon teachers who apply it in terms of the following aspects:

- The scientific content of the subject of specialization
- Pedagogical Content Knowledge (PCK)
- Collaborative work culture
- Positive Aspects
- Challenges

The questionnaire was used simultaneously with other data collection methods to help in providing a comprehensive overview of LS model. The results of the quantitative dataset will further be discussed together with those generated from qualitative datasets in the next chapters.

It is important to choose the right statistical technique that produces an accurate conclusion about the study findings. Therefore, the process of data analysis in the current study went through a number of steps, starting with data entry onto the computer and ending with descriptive analysis of the findings obtained. The Statistical Package for the Social Sciences

(SPSS) software was used to process and analyse the data gathered using questionnaires. The decision was to use descriptive statistical analysis such as frequencies and percentages as well as the means and standard deviations to explore the data in relation to the research questions.

As explained in detail in the previous chapter, the questionnaire was designed based on reviewing relevant literature to collect data from teachers and applying the LS model in order to answer the following operational research questions:

1. What are the perceptions of teachers regarding:
 - The use of LS in developing their CK of primary school Maths, Science, and Arabic?
 - The use of LS in developing their PCK of primary school Math, Science, and Arabic?
 - The influence of participating in LS activities on building a collaborative learning community in their school?
 - The benefits of using LS in primary schools for the teaching of Math, Science and Arabic?
 - The challenges of using LS in primary schools for the teaching of Math Science and Arabic?
2. Are there any significant differences among the participants' perceptions due to their gender, age, experience, specialization, educational level and experience in using LS model?

In order to answer these questions, the questionnaire distributed to the research participants consisted of two main sections:

- First section: Demographic information
- Second section: Questionnaire statements

6.2 Statistical Tests

This study used a questionnaire to measure the perceptions of teachers in applying the LS Model for teacher professional development in KSA. The Likert scale was used in this study to measure the participants' responses. The Likert scale is, "a response format where responses are gathered using numbers spaced at equal intervals" (Trochim et al., 2016, p.183). The two popular statistical techniques used in research are parametric and nonparametric tests. According to Abu-Bader (2016) "Non-parametric tests are ideal for use when the level of measurement for the dependent variable is nominal or ordinal." He added that non-parametric can be used when the parametric assumptions were violated such as normal distribution or sample size. Parametric tests (PT) in comparison to nonparametric tests (NPT) are more powerful yet they require a higher sample size (Sullivan and Artino, 2013). The parametric tests are more powerful because "parametric tests give a better chance detecting significant result when, in fact, they exist" (Abu-Bader, 2016, p. 3). PT can also be used with ordinal data, but they are generally more robust than nonparametric tests (Sullivan and Artino, 2013). The advantages of using PT in this research include the robustness it offers as an analytical tool (Carifio and Perla, 2008), and dependence on the assumption of normal distribution (Norman, 2010; Murray, 2013).

Other statistical measures used alongside PT in this study were t-test and one-way ANOVA. The decision to do so was to ensure robustness (Carifio and Perla, 2008), and improve the assumption of normal distribution for this study (Norman, 2010; Murray, 2013). The original dependent variable was skewed based on the result of Kolmogorov-Smirnov $D(50) = .173$, $p = .001$.

The dependent variable was transformed in order to achieve normal distribution using the reciprocal transformation method. Defined as a transformation method that is used to make the data distribution of a continuous variable looks normally distributed (Beasley et al., 2009); reciprocal transformation reduces all values more than one to small values (Field, 2020). Reciprocal transformation can be done by dividing 1 by each value (Sydsaeter et al., 2008). In this study, the transformed dependent variable was normally distributed based on the result of Kolmogorov-Smirnov $D(50) = .072$, $p = .20$. This was followed up by a post-hoc test based on the least significant difference (LSD) test to understand which of the groups were statistically significantly different from one another.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LS Model	.173	50	.001	.810	50	.000

Table 6-1 Normality Test for the Dependent Variable (LS Model).

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Reciprocal LS Model	.072	50	.200	.991	50	.970

Table 6-2 Normality Test for the Transformed Dependent Variable (LS Model).

6.2.1 Independent Sample T-tests

The gender element of the quantitative data was analysed using an independent t-test. The t-test is a statistical technique used in social research to find out the differences between two groups (Mowery, 2011). It is considered a rigorous parametric test of statistical significance, which compares the means of two sets of scores to decide whether the difference between them is statistically significant at the chosen alpha level (Martella et al., 2013). To understand the gender differences in the use of LS, the t-test was applied in this study.

6.2.2 One-way ANOVA

The one-way ANOVA was the second test used to compare between the following variables: age, experience, specialization, educational level and experience in using LS model. This was to explore whether there were statistically significant differences between these variables. The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the mean of two or more independent (unrelated) groups (although you tend to only see it used when there are a minimum of three groups, rather than two) (Martella et al., 2013). The one-way ANOVA has also been described as an omnibus test statistic since it does not indicate which specific groups were

statistically significantly different; rather it only indicates that at least two groups were different (Martella et al., 2013).

6.2.3 The Post Hoc Tests

The post hoc tests, also known as posteriori tests, were used to determine and confirm where the differences between the groups occurred. The post hoc tests were only run because the data showed an overall statistically significant difference in the group mean (i.e., a statistically significant one-way ANOVA result) (Benavoli et al., 2016). Similar to the one-way ANOVA, post hoc tests attempt to control the experiment wise error rate.

6.2.4 The Least Significant Difference

The least significant difference (LSD) test was used in the context of the analysis of variance, when the difference between the population mean was significant (Williams and Abdi, 2010). The significance of the LSD test is that it helps to identify the populations whose mean is statistically different by comparing the populations taken in pairs.

6.3 Statistical analysis

The statistical analysis of the questionnaires was performed using the Statistical Package for Social Sciences (SPSS) programme. The study relied on four descriptive analytical statistical measures: Frequencies (number of cases in the research); Percentages (number of cases in the research in a percentage form); Mean (the average values); and Standard deviation (measure of the dispersal of a set of numbers).

Data management and analysis were conducted using SPSS software. Descriptive statistics were used to describe the characteristics of the sample, check and summarise the dataset by using numbers or graphs to answer the particular research questions (Pallant, 2020, Brace et al., 2012). Using frequencies and percentages to describe the sample using participants' demographic information, the researcher used the descriptive statistics method to analyse the first section of the questionnaire. Furthermore, the frequency and percentage for each statement was determined based on the ratings the participants gave, and a rank order was given to each statement based on its agreement values. This process was used in each dimension of the questionnaire.

To identify whether there were statistical differences between the participants' perceptions according to their gender, age, experience, specialization, educational level and experience in using LS model the t-test was used to determine whether two groups of the categories (gender) have statistically significant differences. One-way ANOVA was used to compare between three groups of categories (age, experience, specialization, educational level and experience in using LS model) to determine whether there were statistically significant differences between these groups. After that, a post-hoc test based on the LSD test followed to determine which of the groups were statistically significantly different from one another.

Basically, the Likert Scale is an ordinal scale of measurement used to order categories (McCrum-Gardner, 2008; Cohen et al., 2007). The two popular techniques used to assess questionnaires are parametric and nonparametric techniques. Non-parametric techniques are ideal for use when the data are measured on nominal (categorical) and ordinal (ranked) scales," (Pallant, 2020, p. 213). Parametric tests (PT) in comparison to nonparametric tests (NPT) are more powerful and require less sample size (Sullivan and Artino, 2013). PT can also be used with ordinal data, but they are generally more robust than nonparametric tests (Sullivan and Artino, 2013). Non-parametric tests are applied when there are no assumptions about the underlying population characteristics and distribution (Pallant, 2020; Cohen et al., 2007). The advantages of using PT in this research include the robustness it offers as an analytical tool (Carifio and Perla, 2008), and its dependence on assumption of normal distribution (Norman, 2010; Murray, 2013).

The Questionnaire utilises a five-point, forced Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The statements of the survey are categorised into representative groups:

- Items (9, 10, 11, 12, 13) focus on developing teachers' Content Knowledge.
- Items (2, 3, 4, 5, 6, 7) focus on developing teachers' Pedagogical Content Knowledge.
- Items (1, 8, 15, 16, 19, 24) focus on building a collaborative learning community in the school.
- Items (14, 17, 18, 20, 21, 22, 23) assess the benefits of using LS in primary schools.
- Items (25, 26, 27, 28, 29, 30, 31, 32, 33) pertain to the challenges of using LS in primary schools.

6.4 Back-to-Back-Translation Technique

The back-to-back translation technique was used to translate the questionnaire. It involved the services of three independent professional translators. Firstly, one of the translators converted the scale statements from English to Arabic. Then, two other translators independently converted the scale statements back to English. After that, the two English versions of the scale statements were compared to the original scale statements. Modifications were made to the Arabic versions as a result of the issues raised from the back-translated items. Geisinger (2003) argued that, “The quality of the translation is evaluated in terms of how accurately the back-translated versions agree with the original text” (p. 107). The corrected final version of the questionnaire was administered to a group of public school teachers in Saudi Arabia. The internal consistency of the variables was analysed using Cronbach’s Alpha. Further explanation will follow in the next section.

6.5 Reliability and Validity

Reliability is concerned with the question of whether or not a result is stable (Bryman and Bell, 2007; Boswell and Cannon, 2007). In this study, the reliability was tested using Cronbach Alpha, a commonly used measure for internal consistency and reliability in quantitative research (Hair et al., 2010). Cronbach’ Alpha provides a coefficient of inter-item correlations that is the correlation of each item with the sum of all the other items (Cohen et al., 2007). Cronbach’s Alpha also quantified the reliability of data based on the coefficient which ranges between 0 to 1; values nearer 0 are considered not reliable, but values closer to 1 are considered very reliable. (Cronbach, 1951). Table 6.3 below provides the range of Cronbach’s Alpha values and its interpretation.

Cronbach's Alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Table 6-3 Alpha values.

In this study, the Cronbach's Alpha coefficients for each variable were higher than the recommended benchmark of 0.70 (see Table 6.4 below). The results showed that all items have a strong significant correlation above 0.70 (Bonett and Wright, 2015), indicating an excellent scale of internal consistency.

It was also important to assess the reliability of the collected data (Carver and Nash, 2011). As illustrated in Table 6.4 below, the statistical results of the analysis show that the Cronbach's Alpha coefficient for the 33 items was 0.947 indicating a relatively high internal consistency since the threshold value is usually 0.7 in most social sciences studies (Hernon and Schwartz, 2009; Bryman and Cramer, 2011). The higher internal consistency value of 0.947 should be sufficient to demonstrate its reliability. However, the data which was collected from qualitative method respondents was also used to improve the reliability of the questionnaire.

FCOS subscales	No. of Items	Cronbach's Alpha
Content Knowledge	5	0.925
Pedagogical Content Knowledge	6	0.905
Collaborative learning community	6	0.931
L.S. Benefits	7	0.954
L.S. Challenges	9	0.901
All Scale	33	0.947

Table 6-4 Internal Consistency Analysis for the Questionnaire.

6.6 Evaluating and Analysing Quantitative Data

The interest in the quantitative aspect of this research study was to make use of the numerical information such as mean and standard deviation (SD) in order to explain the variables (Bieger and Gerlach, 1996). The descriptive and statistical data are used to compare the views of male and female teachers in the present study to highlight how the test scores are affected and determined whether the scores increased or reduced depending on the gender, age, experience, specialization, educational level and experience in using LS model. The data was evaluated for reliability and validity before the statistical analysis using SPSS, computer software for analysing quantitative data.

6.7 Data Triangulation

The research design aimed at convergence, divergent and complementary views using both quantitative and qualitative data (Creswell, 2002). This means that both the quantitative and qualitative data were collected at the same point in time. This corroborative approach assisted the researcher to identify common themes across both data for analysis. Specifically, in this chapter, data from female and male teachers were triangulated in this study in order to minimise any potential bias in favour of and/or against any gender (Creswell and Clark, 2011). The use of data triangulation in this study also helped in strengthening the reliability of the data and ensured internal validity (Creswell, 2014).

6.8 Background Information of the Research Participants

The first section of the questionnaire collected personal information to identify the characteristics and distribution of participants based on their gender, age, experience, specialization, educational level and experience in using the LS model. Kagan (2005) argued that biographical data that are particularly important and help to guide the questions include name, age and personal interests of the research participants. Overall, the total number of questionnaire respondents was $n=50$ – that is, $n=25$ (50%) male and $n=25$ (50%) female participants.

6.9 Demographic Distributions of the Full Sample Questionnaire Participants

6.9.1 Teachers' Gender

Before commencing the actual process of data analysis, it can be pointed out from Figure (6.1) below that the numbers of female and male teachers who participated in this questionnaire were equal (25 female and 25 male).

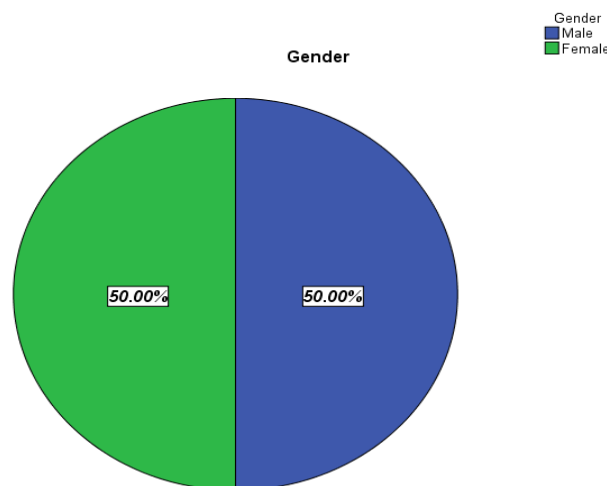


Figure 6-1 The number of the participants classified by teachers' gender.

The above Figure shows the number of the participants classified by gender. Fifty participants, of which twenty-five teachers were male (50%), and twenty-five were female (50%), answered the questionnaire.

6.9.2 Teachers' Age

Figure (6.2) below shows the three age categories of the teachers who participated in this study. The results showed that 6% of teachers were less than 30 years (group one), 36% of teachers were ranging in age from 30 to less than 40 years (group two) while 58% of teachers were 40 years and more (group three).

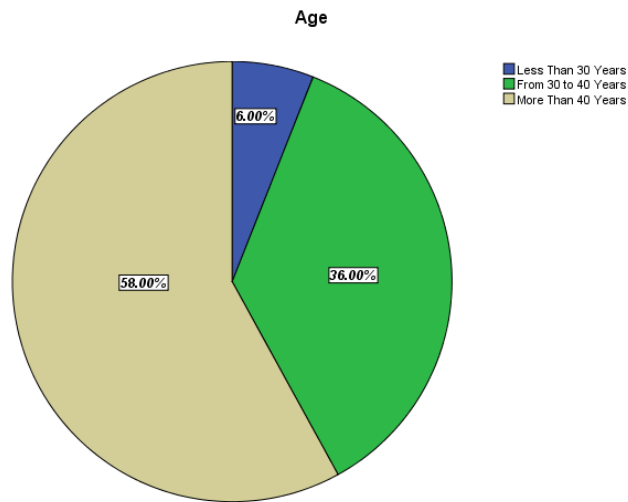


Figure 6-2 The number of the participants classified by teachers' ages.

6.9.3 Teachers' Experience

Figure (6.3) below illustrates the three groups of the teachers who participated in the current study. In group one, 6% of participants had from one year to five years teaching experience. In the second group, 30% of participants had from six years to 15 years teaching experience. As for the third group, 64% of participants had from 16 years and over teaching experience.

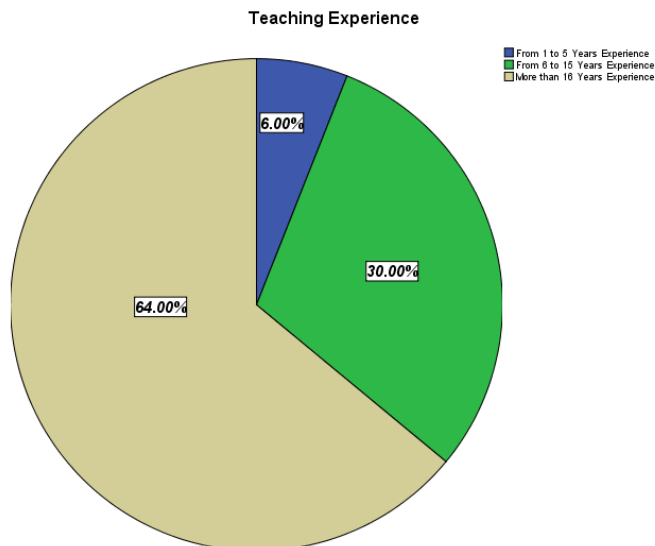


Figure 6-3 The number of the participants classified by teachers' experience.

6.9.4 Teachers' Educational Level

Figure (6.4) below shows the four groups of the teachers who participated in this study. Overall, 8% of the participants had a Master's degree, 84% had a Bachelor's degree, 4% had Diplomas and 4% had other forms of qualification.

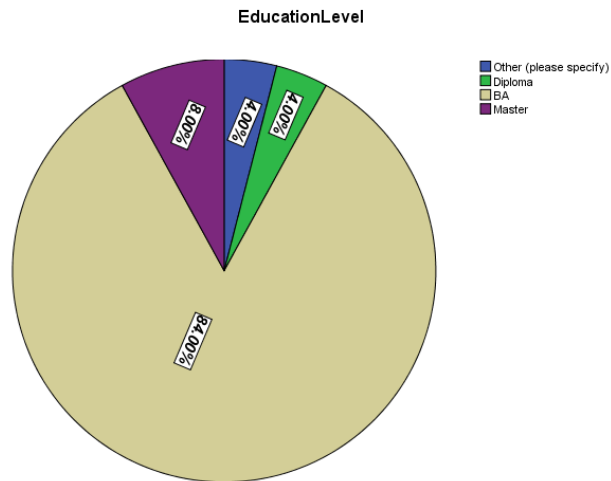


Figure 6-4 The number of the participants classified by teachers' educational level.

6.9.5 Teachers' Specialization

Figure (6.5) below points out the specialization of teachers who participated in this study. Teachers' specialization was classified into four groups; Math teachers represented 26% of participants, Arabic teachers represented 34%, Science teachers represented 26%, and not specified teachers represented 14%.

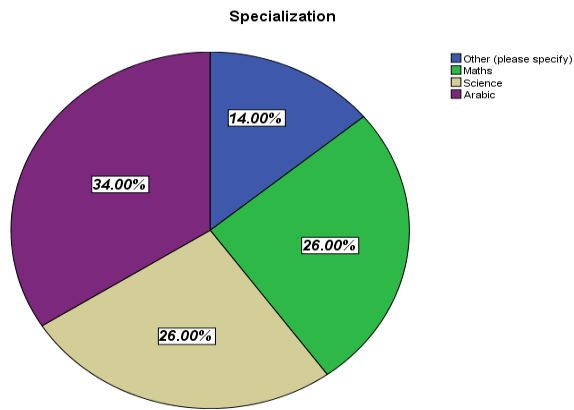


Figure 6-5 The number of the participants classified by teachers' specialization.

6.9.6 Teachers' LS Experience

Figure (6.6) below illustrates three groups of teachers who had experience in using the strategy of LS. Group one had one year of experience (50%), group two had two years of experience (18%), and group three had three years of experience (32%).

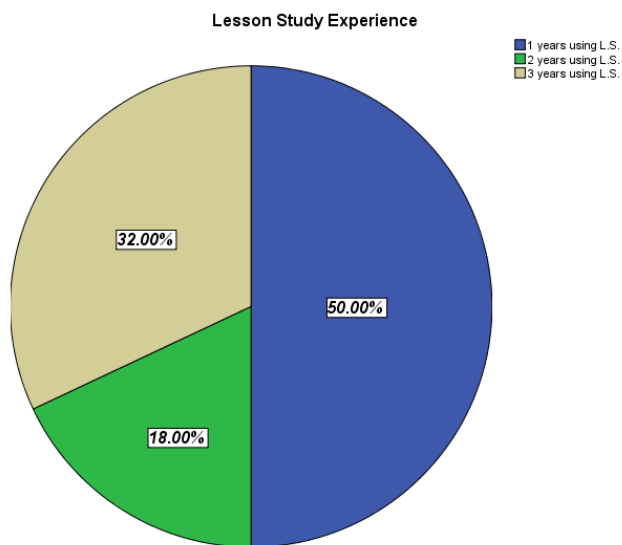


Figure 6-6 The number of the participants classified by teachers' LS experience.

6.10 Data Analysis Using the Likert Scale

The responses were categorized into five categories as part of the data interpretation. These categories were strongly agree, agree, neutral, disagree, and strongly disagree. In this study, as it was mentioned earlier parametric statistical tests were used to analyse the research questions. The independent sample t-test, and one-way ANOVA which are parametric statistical test, were utilized to investigate the possible relationships between the teachers' perceptions concerning the LS model. In addition, a post-hoc test based on the Bonferroni test, was used in order to figure out which of the groups were statistically significantly different from one another.

According to Abu-Bader (2011, p. 16), "Descriptive statistics describe, characterize, or classify data by summarizing them into understandable terms without losing or distorting information". In this research study, the Mean and Standard Deviation (SD) were used in the descriptive part. The Mean represents the average performance of a group and is used in this study to find out the strength of agreement in the responses across the samples. The Standard Deviation (SD) is a measure of the extent to which the values in a distribution cluster around the Mean (Muijs, 2004, p. 107).

RQ1: Teachers' perceptions regarding the use of LS in developing their content knowledge

The answers to the questionnaire items relating to teachers' views of the importance of assessment revealed various responses as illustrated in Table (6.5).

Item No in the Questionnaire	Statements	Mean	SD	Attitude	Rank
9	Sufficient knowledge of the basic concepts that students are expected to learn in the subject I'm teaching	4.36	.898	SA	1
10	Ensuring a deeper understanding of the scientific content related to my field of specialization	4.32	.957	SA	3
11	Perceiving the scientific links between my field of specialization and other fields	4.12	.895	A	5

12	Being prepared for discussing any scientific or perceptual aspects related to my field of specialization	4.30	.931	SA	4
13	Ability to link the subject with the student's real life	4.34	.961	SA	2
Overall		4.28	.790	SA	

Table 6-5 The use of LS in developing their content knowledge.

As shown in Table 6.5 above, the overall teachers' perceptions regarding the use of the LS model in developing their CK is high with the mean (4.28) and SD (0.790). This indicates that most of the teachers had a positive perception toward using the LS model. Furthermore, the responses from the research participants appeared to suggest a ranking in their perceptions of how the use of LS helps in developing their CK. For instance, the question of teachers' "Sufficient knowledge of the basic concepts that students are expected to learn in the subject I'm teaching" was ranked top most in the teachers' perceptions regarding the use of LS in developing their CK with mean (4.36) and SD (0.898). On the other hand, the question of teachers' "Perceiving the scientific links between my field of specialization and other fields" was ranked bottom with mean (4.12) and SD (0.895). In between these two ends were questions about their: "Ability to link the subject with the student's real life" (ranked 2nd); "Ensuring a deeper understanding of the scientific content related to my field of specialization" (ranked 3rd) and "Being prepared for discussing any scientific or perceptual aspects related to my field of specialization" (ranked 4th). Although the questionnaire did not provide an opportunity for the participants to offer reasons for their ranking, nonetheless, the findings are somehow reflective of their individual experiences of the use of LS in developing their CK in a variety of ways.

The findings above indicated that the perceptions of teachers regarding the use of LS in developing their CK, though largely positive overall, they depend on specific areas of teaching and learning. For instance, the perceived impact of LS on the teachers' CK in Arabic is not the same as the perceived impact on Science and Maths. This important finding highlighted that teachers' CK is a broad category under LS which requires interpretation with caution. The finding revealed that even within the same subject area, the impact of LS might differ depending on the area and the different points in time during the implementation process.

RQ2: Teachers' perceptions regarding the use of LS in developing their pedagogical content knowledge (PCK)

The answers to the questionnaire items relating to the views that the teachers held under the category of the importance of LS model in developing their PCK revealed various responses as illustrated in table (6.6) below.

Item No in the Questionnaire	Statements	Mean	SD	Attitude	Rank
2	Using Active Learning Strategies in Teaching	4.46	.838	SA	1
3	Employing Technology in Teaching	4.26	.922	SA	3
4	Providing Students with various learning methods	4.40	.904	SA	2
5	Using various and multiple formats for evaluation	4.12	1.003	A	6
6	Using Alternative Teaching Strategies for students with learning disabilities	4.14	.926	A	5
7	Understanding how students learn the subject I'm teaching	4.22	.887	SA	4
Overall		4.26	.779	SA	

Table 6-6 The use of LS in developing the PCK of teachers.

In the case of teachers' perceptions regarding the use of LS in developing their PCK, Table 6.6 above illustrates the research outcome. Overall, the teachers' perceptions regarding the use of LS model in developing their PCK is high with the mean (4.26) and SD (0.779). Furthermore, the responses from the research participants appeared to suggest a ranking in their perceptions of how the use of LS helps in developing their PCK. For example, the question of teachers "Using Active Learning Strategies in Teaching" was ranked topmost in the teachers' perceptions regarding the use of LS in developing their PCK with mean (4.46) and SD (0.838). However, the question of teachers "Using various and multiple formats for evaluation" was ranked bottom with mean (4.12) and SD (1.003). In-between these two ends were questions about their "Providing Students with various learning methods" (ranked 2nd); "Employing Technology in Teaching" (ranked 3rd); "Understanding how students learn the subject I'm teaching" (ranked 4th) and "Using Alternative Teaching Strategies for students with learning disabilities" (ranked 5th).

The findings demonstrate that most of the teachers appeared to have a positive perception toward using the LS model in developing their PCK since all items were scored high. The findings also provide glimpses of a narrative that suggests that the perceptions of individual teachers' experiences of the use of LS in developing their PCK is relative depending on the area of PCK. For instance, it appears that teachers were more positive in their perceptions of using LS to develop the active learning strategies in teaching as a dimension of PCK, but less inclined to do so in terms of the use of multiple formats for evaluation. Although the research questionnaire did not explore the possible reasons behind such rankings, it can be inferred that having a large of teachers reporting that they understood or felt prepared to use active learning strategies in teaching after participating in LS could be reflective of the positive impact of LS on teachers' PCK particularly as the literature suggests that the existing teaching methods largely lacked creativity (Al-Mutairi, 2006; Buthaina, 2006).

RQ3: Teachers' perceptions regarding the benefit of LS in building a collaborative learning community in their school

The answers to the questionnaire items relating to the views that the teachers held under the category of the benefit of the LS model in building a collaborative learning community in their school revealed various responses as illustrated in Table (6.7).

Item No in the Questionnaire	Statements	Mean	SD	Attitude	Rank
1	Collaboration with Colleagues	4.50	.953	SA	2
8	Exchange of knowledge and experience with colleagues	4.64	.776	SA	1
15	Alleviating my sense of isolation at school	4.06	1.268	SA	6
16	The lesson study model helps team members work together	4.34	1.062	A	4
19	The lesson study model enables team members to observe each other to improve their respective teaching practices	4.30	1.015	A	5
24	The lesson study model enhances the collaborative work culture at school	4.38	1.048	SA	3
Overall		4.37	.889	SA	

Table 6-7 The benefit of LS in building a collaborative learning community.

As shown in Table 6.7 above, the overall teachers' perceptions regarding the benefit of using LS model in building a collaborative learning community in their school is high with a mean score of (4.37) and SD (0.889). The responses from the research participants suggested a ranking in their perceptions of the importance of the LS model for building a collaborative learning community in their schools. For example, the question of teachers', "Exchange of knowledge and experience with colleagues", was ranked topmost in the teachers' perceptions regarding the importance of LS for building a collaborative learning community in their schools with mean (4.64) and SD (0.776). At the other end was the question of, "Alleviating my sense of isolation at school", which was ranked bottom with mean (4.06) and SD (1.268). In between these two ends were questions about their: "collaboration with colleagues" (ranked 2nd); "The LS model enhances the collaborative work culture at school" (ranked 3rd); "The LS model helps team members work together" (ranked 4th); and "The lesson study model enables team members to observe each other to improve their respective teaching practices" (ranked 5th).

As presented in the above table, the findings suggest that most teachers believe in the importance of the LS model for building a collaborative learning community in their schools. The results of the questionnaire also provide glimpses of the individual teacher’s confidence and anticipation of the importance of the LS model for building a collaborative learning community in their schools which could be useful for a successful adoption and usage. Specifically, the findings show that teachers perceive, “Exchange of knowledge and experience with colleagues” as the most important use of LS for building a collaborative learning community in their schools. They also perceive “Alleviating my sense of isolation at school” as the least important use of LS for building a collaborative learning community. This could mean that teachers in the KSA already have and/or rely on existing social networks to minimise social isolation, but on the other hand they do not have close networks to exchange knowledge and work-related experiences – hence the current ranking.

RQ4: Teachers’ perceptions regarding the benefits of using LS in primary schools for the teaching of Math, Science and Arabic.

The answers to the questionnaire items regarding the views that teachers held under the category of the benefit of using LS model in primary schools for the teaching of Math, Science and Arabic revealed various responses as illustrated in Table (6.8) below.

Item No in the Questionnaire	Statements	Mean	SD	Attitude	Rank
14	Upgrading my teaching practices	4.34	1.081	SA	1
17	The lesson study model contributes to the development of a sense of collective responsibility towards student learning	4.32	1.039	SA	2
18	The lesson study model reports provide a helpful resource to other teachers	4.12	1.154	A	7
20	The lesson study model helps teachers plan lessons more effectively	4.24	1.153	SA	5
21	The lesson study model ensures a deeper student understanding	4.14	1.069	A	6
22	The lesson study model contributes to the teacher being more confident while teaching	4.32	.935	SA	3
23	Planning lessons with others is better than planning lessons individually	4.26	1.157	SA	4

Overall	4.24	.961	SA
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Table 6-8 The benefit of using LS in primary schools for the teaching of Math, Science and Arabic.

Table 6.8 above shows that, overall, the teachers’ perceptions regarding the benefits of using the LS model in primary schools for the teaching of Math, Science and Arabic is high with a mean score of (4.24) and SD of (0.961). In addition, the responses from the research participants appeared to suggest a ranking in their perceptions of the benefits of the LS model in primary schools for teaching of Math, Science and Arabic. For instance, the question of teachers “Upgrading my teaching practices” was ranked topmost in the teachers’ perceptions regarding the benefits of LS in primary schools for teaching Math, Science and Arabic with mean (4.34) and SD (1.081). At the other end was the question of “The lesson study model reports provide a helpful resource to other teachers” which was ranked bottom with mean (4.12) and SD (1.154). In-between these two ends were questions about “The LS model contributes to the development of a sense of collective responsibility towards student learning” (ranked 2nd); “The LS model contributes to the teacher being more confident while teaching” (ranked 3rd); “Planning lessons with others is better than planning lessons individually” (ranked 4th); “The LS model helps teachers plan lessons more effectively” (ranked 5th); The LS model ensures a deeper student understanding (ranked 6th) and “The LS model reports provide a helpful resource to other teachers” (ranked 7th).

The above findings indicate that the perceptions of teachers regarding the benefits of using the LS model in primary schools for teaching Math, Science and Arabic was positive with all scores close to "strongly agree". The findings also seem to suggest that “Upgrading my teaching practices” was perceived as the most beneficial while “the provision of helpful resources to other teachers was considered less beneficial. This means that the teachers appear to be having more opportunities for learning new teaching strategies through the LS model than they do in terms of its provision of helpful resources.

RQ 5: Teachers’ perceptions regarding the challenges of using LS in primary schools for the teaching of Math, Science and Arabic.

The answers to the questionnaire items relating to the views that teachers held under the category of the challenges of using LS model in primary schools for the teaching of Math, Science and Arabic revealed various responses as illustrated in Table (6.9) below.

Item No in the Questionnaire	Statements	Mean	SD	Attitude	Rank
25	Insufficient time for collaborative lesson study activities at school	4.36	.964	SA	1
26	Lack of adequate understanding by school management of how to implement the lesson study model	3.66	1.239	A	5
27	Lack of adequate understanding by teachers of how to implement the lesson study model	3.68	1.220	A	4
28	Lack of sufficient support and resources that enable high quality implementation of the lesson study model	3.90	1.233	A	2
29	Lack of long term vision for the implementation of the lesson study model	3.80	1.125	A	3
30	Lack of adequate knowledge of the scientific content of respective teacher subject specializations upon the implementation of the lesson study model	2.80	1.340	N	9
31	Lack of adequate knowledge of the teaching skills possessed by teachers upon the implementation of the lesson study model	2.98	1.317	N	8
32	Inadequate emphasis upon students' educational needs	3.34	1.222	N	7
33	Lack of sufficient school administrative structures to activate the lesson study model	3.64	1.241	A	6
Overall		3.57	.907	A	

Table 6-9 The challenges of using LS in primary schools for the teaching of Math, Science and Arabic.

As shown in Table 6.9, the overall teachers' perceptions regarding the challenges of using LS model in primary schools for the teaching of Math, Science and Arabic is nearly at the moderate level with the mean score of (3.57) and SD (0.907). This indicates that all teachers do not believe in the challenges of using LS model for the teaching of Math, Science and Arabic within the primary school. The results showed that some participants scored the scale items in this dimension as "Agree" level and some participants scored the scale items in this dimension as "Neutral" level. The most ranked item was no. 25 "Insufficient time for collaborative lesson study activities at school" with a mean score of (4.36) and SD (0.964). Item no. 30 "Lack of adequate knowledge of the scientific content of respective teacher subject specializations upon the implementation of the LS model" was ranked last with a mean score (2.80) and SD (1.340). Furthermore, mean and SD scores of all items indicated

that all teachers' scores were close to "agree" level regarding the challenges of using the LS model for the teaching of Math, Science and Arabic within the primary school.

The findings demonstrate that there are challenges in the use of the LS model in the teaching of Science, Mathematics and Arabic in KSA. It is likely that these perceptions are of the newness of the model to the teachers, but it could also be as a result of the lack of resources. Therefore, this could be an interesting area for further research.

6.11 Other Dimensions

The data collected presented other interesting dimensions regarding the following research question:

Are there any significant differences among the participants' perceptions due to their gender, age, experience, specialization, educational level and experience in using the LS model?

The outcomes are presented below according to specific thematic areas detailed in the next subsections.

6.11.1 Gender Differences

As can be seen in Table 6.10 below, the t-test results show that teachers do not have different degrees of perception regarding the benefit of the LS Model as a PD approach due to gender (Male and Female). This section focuses on the gender differences of the research respondents.

	male		female		T- Value	df	Sig
	teachers		teachers				
	M	SD	M	SD			
LS Model	1.41	.179	1.41	.148	-.080	46.32	.936

Table 6-10 T-test for the LS Model by Gender variable.

An independent t-test analysis was used to identify any differences between male and female teachers regarding their application of the LS Model as a PD approach . The dependent

variable LS Model was transformed using reciprocal transformation in order to address the skewness. From Table 6.10 above, it can be seen that there are no significant differences between the male and female teachers (t -value = -0.080, $p = 0.936 > 0.05$). The mean score for males was 1.41 with SD 0.179 while the mean score for females was 1.41 with SD 0.148. This result indicates that both male and female teachers have a similar mean score (1.41), which means that there appear to be no significant differences between the participants' perceptions in favour of the female gender.

6.11.2 Age Differences

To address this question, SPSS software was utilized to perform one-way analysis of variance (ANOVA) and report the findings to reveal any significant differences among the participants' perceptions due to the age variable.

All scale	< 30 years		30-40 years		> 40 years		F	Sig
	M	SD	M	SD	M	SD		
LS Model	1.48	0.043	1.41	1.83	1.40	0.158	0.354	0.704

Table 6-11 One-way ANOVA for the LS Model by age variable.

The one-way ANOVA test was used to identify any differences between different age groups among teachers regarding their application of the LS Model as a PD approach. The transformed dependent variable LS Model was used (reciprocal transformation) in order to address the skewness. The assumption of homogeneity was met based on Levene's test. As shown in the Table above, the results suggest that there were no significant differences among the participants according to their views about the application of the LS Model as a PD approach [$F = 0.354$, $p > .05$]. This result indicated that all teachers from all ages appeared to have similar perceptions regarding the application of the LS Model.

6.11.3 Differences in Experience

To address this question, SPSS software was utilized to perform one-way analysis of variance (ANOVA) and report the findings to reveal any significant differences among the participants' perceptions due to the experience variable.

All scale	1-5 years		6-15 years		16 years & up		F	Sig
	M	SD	M	SD	M	SD		
LS Model	1.39	0.145	1.43	0.164	1.39	0.166	0.399	0.673

Table 6-12 One-way ANOVA for the LS Model by Experience variable.

The one-way ANOVA test also was used to identify any differences between different experience groups among teachers regarding their application of the LS Model as a PD approach. In order to meet the assumption of normality the dependent variable LS Model was transform using reciprocal transformation. According to Levene's test, the assumption of homogeneity was met, so the result of ANOVA was reported. As shown in the above Table, the results suggest that there were no significant differences among the participants in their views regarding the application of the LS Model as a PD approach [$F= 0.399, p>.05$]. This result showed that all teachers appeared to have similar perceptions concerning the application of the LS Model regardless of their experiences.

6.11.4 Differences in Specialization

To address this question, SPSS software was utilized to perform one-way analysis of variance (ANOVA) and report the findings to reveal any significant differences among the participants' perceptions due to the specialization variable.

All scale	Maths		Science		Arabic		other		F	Sig
	M	SD	M	SD	M	SD	M	SD		
LS Model	1.42	0.180	1.41	0.175	1.39	0.152	1.39	.160	0.124	0.945

Table 6-13 One-way ANOVA for the LS Model by specialization variable.

In this research question, the one-way ANOVA test was used to identify any differences in specialization among teachers regarding their application of the LS Model as a PD approach. The assumption of normality for the dependent variable LS Model was met after transforming the variable using reciprocal transformation. Based on Levene's test result, the assumption of homogeneity was met, so the result of ANOVA was reported. As shown in Table 6.13 above, the results indicated that there were no significant differences among the participants' perceptions due to their specialization (Maths, Science, Arabic, or other) [$F=0.124$, $p>.05$]. This result revealed that all teachers, regardless their specialization, appeared to have the same perception concerning the application of the LS Model as a PD approach.

6.11.5 Differences in Educational Level

Using the SPSS software to perform a one-way analysis of variance (ANOVA) and report the findings, an attempt was made to reveal any significant differences among the participants' perceptions due to the Educational Level variable.

All scale	Diploma		BA		MA		Others		F	Sig
	M	SD	M	SD	M	SD	M	SD		
LS Model	1.37	0.097	1.43	0.149	1.19	0.187	1.32	0.182	3.305	0.028

Table 6-14 One-way ANOVA for the LS Model by the Educational Level variable.

The one-way ANOVA test was used to analyze this research question regarding differences in education levels among teachers regarding their application of the LS Model as a PD approach. The assumption of normality was met after transforming the dependent variable LS Model using reciprocal transformation. The Levene's test result indicated that the assumption of homogeneity was met, so the result of ANOVA was reported. As shown in Table 6.14, the results indicated that there was at least one significant difference among the participants' perceptions due to their Educational Level (Diploma, BA, MA, or Others) [$F=3.305$, $p=.028$]. This result suggested that the teachers appeared to have different perceptions regarding the application of the LS Model as a PD approach due to their level of education.

Education Level	Education Level	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Other	Diploma	-.04903	.15252	.749	-.3560	.2580
	BA	-.10730	.11039	.336	-.3295	.1149
	Master's (M)	.13491	.13209	.312	-.1310	.4008
Diploma	Other	.04903	.15252	.749	-.2580	.3560
	BA	-.05827	.11039	.600	-.2805	.1639
	M	.18394	.13209	.170	-.0819	.4498
BA	Other	.10730	.11039	.336	-.1149	.3295
	Diploma	.05827	.11039	.600	-.1639	.2805
	M	.24220*	.07981	.004	.0816	.4029
M	Other	-.13491	.13209	.312	-.4008	.1310
	Diploma	-.18394	.13209	.170	-.4498	.0819
	BA	-.24220*	.07981	.004	-.4029	-.0816

Table 6-15 LSD Multiple Comparisons for the LS Model by the Educational Level variable.

Based on Table 6.15 which shows the result of LSD multiple comparisons for LS Model by the educational level variable, there is a significant difference in education levels among teachers regarding their application of the LS Model as a PD approach. The difference was between teachers who had a Bachelor's degree and those who had a Master's degree $p = .004$.

6.11.6 Differences Due to the Experience in Using the LS Model

In order to address this question, the SPSS software was used to perform a one-way analysis of variance (ANOVA), and any significant differences among the participants' perceptions due to their experience in using LS model are reported in the findings below.

All scale	One Year		Two Years		Three Years		F	Sig
	M	SD	M	SD	M	SD		
LS Model	1.43	0.132	1.37	0.166	1.37	0.201	0.854	0.432

Table 6-16 One-way ANOVA for LS Model by experience in using LS model.

This research question was analysed using the one-way ANOVA test to identify the differences in experience in using LS model among teachers regarding their application of the LS Model as a PD approach of choice for their PD. The dependent variable LS Model was skewed. To meet the assumption of normality, reciprocal transformation was used. Based on the Levene's test result the assumption of homogeneity was met, so the result of ANOVA was reported. As shown in the above table, the results indicated that there were no significant differences among the participants' perceptions due to their experience in using LS model [F= 0.854, $p > .05$]. This result demonstrated that all teachers who had applied the LS model for one year or more, appear to have the same perception regarding the application of the LS Model as a PD approach.

The result of one-way ANOVA for the teachers' use of the LS model regarding their age, experience, specialization, educational level, and experience indicated nonsignificant differences among teachers. Only one of the one-way ANOVA tests was significant which was regarding the teachers' level of education. These nonsignificant one-way ANOVA results can occur as a result of different reasons. According to Dahiru (2008), the sample size can affect the p-value – that is, larger sample size can help to detect differences in significant p-value compared to smaller sample size. Similarly, Dahiru (2008) added that higher standard deviation can help to decrease the P-value.

6.12 Chapter Summary

The chapter provides an analysis of data collected through an administered questionnaire to teachers across four different schools in the Riyadh region in KSA in order to measure the extent of the impact of using LS as a model of PD on teachers in primary schools in a number of dimensional areas – that is, CK, PCK, collaboration, benefits, and challenges. The descriptive findings from mean and SD suggested that, overall, the answers to all the

questions related to the perceptions of the teachers across all the five dimensions except one (that is, challenges) strongly agree; with challenges as a dimension indicating agree.

The result of two independent sample t-tests indicated that there was no significant difference among male and female teachers in the perceptions about the application of the LS model. The chapter shows that the result of the one-way ANOVA test indicated that there were no significant differences in the mean level of the perceptions about the application of the LS model regarding the teachers' age, experience, specialization, and experience. Only one result of the one-way ANOVA test indicated significant differences in the mean level of the perceptions about the application of the LS model regarding teachers' education level. LSD result indicated that the difference was between teachers who have a Master's degree and those who have a Bachelor's degree.

Chapter 7 Analysis of the Qualitative Data

7.1 Introduction

This chapter presents the analysis of the qualitative data collected from teachers and school leaders within the four selected primary schools in the Riyadh region which are implementing Lesson Study (hereafter, LS) as a model of school-based professional learning. The qualitative data collection method resulted in large amounts of rich and detailed data, which is analysed based on Content Analysis (CA). The data analysis is therefore guided by the raw data and reviewed literature.

7.2 Content Analysis (CA)

Defined generally as, “a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” (Krippendorff, 2018, p. 24); CA is a widely used method in qualitative research based on a descriptive approach. As an approach to analysing qualitative data, CA is used in the determination of the presence and perhaps absence of meaningful concepts, terminologies, or words in one or more pieces of recorded communication (interviews). Though largely descriptive, CA is widely used in qualitative research. The approach offers the researcher the opportunity to view the data as representations of texts, images, and/or expressions that are created to be seen, read, interpreted, and acted on for their meanings, rather than as physical events (Krippendorff, 2018).

Qualitative CA is also seen as a method to systematically transform large amounts of text into highly organized, concise, and summary of key results from verbatim transcribed interviews to categories or themes (Sandelowski, 1995). Further, CA allows for the making of replicable and valid inferences from data (Krippendorff, 2018). CA, therefore, is arguably one of the most important research techniques in the social sciences today. This analytical tool was relied on alongside thematic analysis to organise and analyse the data in this study.

7.2.1 Content analysis and thematic analysis

Recognising that both content and thematic analysis share the same aim of analytically examining narrative materials from life stories by breaking the text into relatively small units

of content and submitting them to descriptive treatment (Sparker, 2005); the choice of an analytic tool for this study was between these two. I explored the use of thematic analysis first, but that was discarded because it did not seem to provide analysis that was holistic nor answer the research questions in greater depth (B&C, 2006). After careful consideration, I chose using content analysis primarily because it supports applying the analytical approach needed for this research which essentially is an exploratory work in an area where not much is known (Green and Thorogood, 2004; Elo and Kyngäs, 2008).

The selected approach required more interpretation and involvement from the researcher. For example, before analysis happened, the researcher was moving from merely counting phrases and words and to focusing on identifying and describing ideas, whether expressed or implicit in the data to help outline the analysis (Namey et al., 2008). In this way, content analysis was useful to make connections between the results and the context where it took place to understand meaning (Selvi, 2019). During the analysis process, judgements were made about attributing data to codes and refining codes where things had to be interpreted (B&C, 2006). The approach emphasised examining and recording themes (or patterns) within data. Therefore, the approach is based on interpretivism providing descriptions, explanations and establishing relationships that are categorised and subsequently explored and refined to be applied to participants, cases and contexts as well as develop a narrative explaining the phenomena researched. Although most authors believe that the process of CA is flexible and subjective, this research was guided by the steps outlined by Elo and Kyngäs (2008) to address its potential limitations.

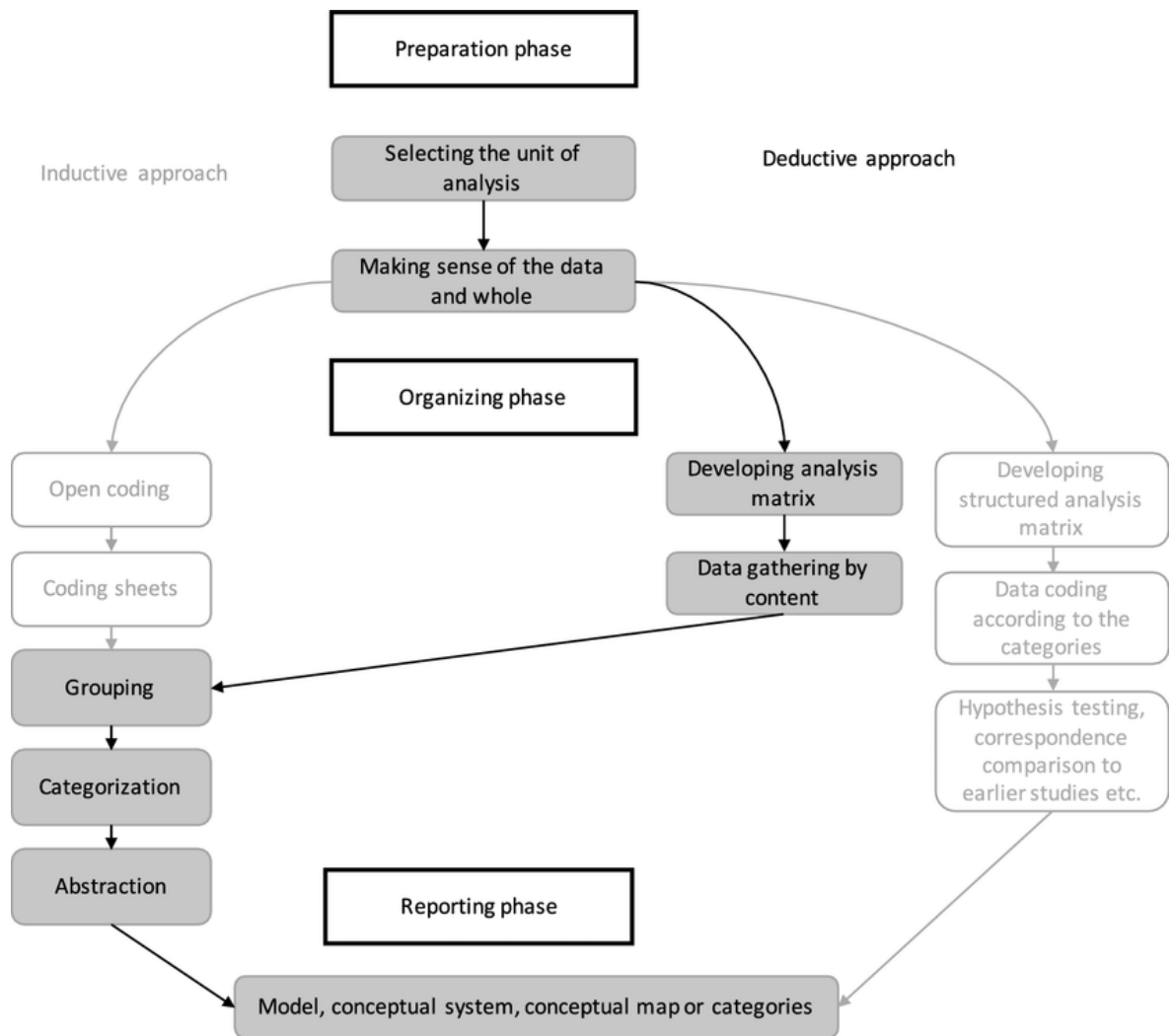


Figure 7-1 Content analysis process by Elo & Kyngäs (2008).

7.2.2 Content analytical processes

This section provides a brief description of the content analytical processes used in this research. It is important to note that in this research a hybrid approach was used involving the following steps in carrying out CA:

- Transcription of the interviews into texts given that the objective of any CA is to systematically transform a large amount of text into a highly organised and concise summary of key results.
- Reading and re-reading the transcripts in order to get a general sense and understanding of what the participants were seeking to express.
- Sorting the data – that is, starting to divide the text into smaller parts.

- Condensing these smaller parts further while retaining the core meanings. The process of condensation also involved the reduction in text or shortening of the text without changing the main meaning.
- Labelling the condensed meaning units by formulating codes (coding). This process involved the identification and labelling of the condensed text within the data, usually with a word or phrase that best describes what the condensed text represents. The coding process is often systematic and cyclical and eventually helps to filter, highlight, and focus on the important elements of the qualitative data. In the formulation of codes for this study, I developed the codes as descriptive labels with meaning units of the raw data. The developed codes helped in reflecting on the data in new ways, thereby making it easier to identify connections between meaningful units. I stayed very close to the data with very limited interpretation of content during this stage. Furthermore, notes were kept during the coding stage on the impressions and reactions of the researcher to the text.
- Grouping these codes into categories (categorising). This process involved putting together related codes either as a result of their content or context. In other words, categorising means the organizing of codes into groups based on the differences and similarities of the content of the texts that these codes belong to. Categorising helps the researcher in putting into perspective what is visible and obvious in the content of the data. In developing categories, I sorted the codes into appropriate groups (categories) by comparing the codes and appraising them to determine which codes seem to belong together. Therefore, the identified categories in this study consist of codes that appeared to deal with the same issue raised by the research participants.
- Creation of themes. This was the final stage in CA process. It involved the identification and grouping of two or more categories based on expressed underlying meaning or latent content. This process was intended to help the researcher to communicate effectively with the final audience. The identified themes in this study were, therefore, written in a brief and concise manner that was devoid of ambiguities.

According to Braun and Clarke (2006), a theme, “captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set” (p. 82). Themes emerge from a coded dataset and are done in

phases – first phase (the initial themes), second phase (basic themes), third phase (organised themes) and fourth phase (global themes) (Braun & Clarke, 2006, 2013). It is important to mention that themes can be derived from two primary ways – that is, either inductively or deductively. Themes derived through an inductive approach emerge directly from the dataset depending on the spread of the information, as verbalized by the research participants, or through observation (Braun & Clarke, 2006, 2013). Thus, the themes from an inductive approach are data-driven. On the other hand, deductively derived themes are those arrived at through the researcher’s theoretical or analytic interest in the subject matter (Braun and Clarke, 2006). These themes are more explicitly analyst-driven. Both approaches are of the epistemological assumption that knowledge is not static, but is emerging and transforming.

7.3 Description of Interview Participants

There were 16 individual interviews conducted during the course of this study. The following Tables 7.1 and 7.2 contain relevant demographic information about each participant including their age, gender, level of education, years of teaching experience and experience in relation to LS participation at the time of the interview sessions. As indicated in the tables, the participants had varied backgrounds across the three selected subjects of specialisation. Lastly, they also represent a range of teaching experience, from 9- 26 years.

Name of Participant	Name of School	Gender	Age	Teaching Experience (No. of years)	Subject Specialization	Educational Level	Experience in terms of lesson study participation (No. of years)
Teacher 1 (T1)	A	Female	41	18	Science	Bachelor's Degree	1
Teacher 2 (T2)	A	Female	37	14	Mathematics	Bachelor's Degree	1
Teacher 3 (T3)	A	Female	43	20	Arabic Language	Bachelor's Degree	1
Teacher 4 (T4)	B	Female	41	18	Mathematics	Bachelor's Degree	1
Teacher 5 (T5)	B	Female	38	15	Science	Bachelor's Degree	1
Teacher 6 (T6)	B	Female	33	10	Arabic Language	Bachelor's Degree	1
Teacher 7 (T7)	C	Male	48	25	Science	Bachelor's Degree	3

Teacher 8 (T8)	C	Male	45	22	Mathematics	Bachelor's Degree	3
Teacher 9 (T9)	C	Male	32	9	Arabic Language	Master's Degree	1
Teacher 10 (T10)	D	Male	36	13	Arabic Language	Bachelor's Degree	2
Teacher 11 (T11)	D	Male	40	17	Science	Bachelor's Degree	3
Teacher 12 (T12)	D	Male	49	26	Mathematics	Bachelor's Degree	1

Table 7-1 Basic information relating to the teachers interviewed.

Name of Participant	Name of School	Gender	Age	Leading Experience (No. of years)	Educational Level	Experience in terms of lesson study supervision (No. of years)
School leader 1 (SL1)	A	Female	38	5	Bachelor's Degree	2
School leader 2 (SL2)	B	Female	40	4	Bachelor's Degree	2
School leader 3 (SL3)	C	Male	50	8	Master's Degree	3
School leader 4 (SL4)	D	Male	41	4	Bachelor's Degree	2

Table 7-2 Basic information relating to the school leaders interviewed.

Data description, emerging themes and data interpretation

This phase of the research followed data coding and reduction into themes and sub-themes. It marked the beginning of the final step of data analysis and was a particularly significant phase because it sought to move the data from its descriptive nature to include inference necessary for subsequent discussion. Overall, 153 codes were produced from interview responses. These themes were eventually reduced to six themes and 23 sub-themes by the end of the process. **The following are the final themes identified:**

1. Impact of LS on teachers' CK
 - a. Enhanced knowledge and understanding
 - b. Improved teaching-related skills
 - c. Changes in the beliefs and attitudes of teachers

- d. Building confidence in the ability of teachers to teach their subjects of speciality
2. Enhancing the PCK of teachers
 - a. Use of best practices
 - b. Making learning active
 - c. Understanding how children learn their subjects
 - d. Changes in the use of teaching-learning strategies
 - e. Changes in teaching methods (using new learning ways of teaching)
3. Building a collaborative learning community
 - a. Collaboration between teachers
 - b. Collaboration between teachers and students
 - c. Collaboration between teachers, students and school administration
4. Contribution of LS in breaking the culture of isolation
 - a. Breaking the status quo
 - b. Working collaboratively
 - c. Embracing democratic principles
 - d. Other barriers that contribute to isolation
5. Benefits of LS model in the KSA
 - a. Teacher performance
 - b. Teaching practice
 - c. Improving students' outcomes
 - d. Changes in motivation and sense of effectiveness
6. Challenges of LS model in the KSA
 - a. Teaching related (teachers)
 - b. Administration related (school leaders only) obstacles
 - c. Policy related challenge

7.4 Results

This section presents the results from the qualitative data in this study based on the identified themes. Throughout the data presentation, attention is paid to particular elements that might impact on education in the research context, for instance, gender differences and status. Data is also triangulated to establish points of convergence, divergence and complementarity

between the views expressed by teachers on the one hand, and school leaders on the other hand.

7.4.1 Impact of LS on Teacher Content Knowledge (CK)

This section explores the views of the research participants on the use of LS to develop the CK of teachers. CK is defined in this research as, "the body of knowledge and information that teachers teach and that students are expected to learn in a given subject or content area, such as English language, Arts, Mathematics, Science, or Social Studies" (The Glossary of Education Reform, 2016). Their perceptions are organised into three categories, namely, enhanced knowledge and understanding, improved teaching-related skills, and changes in the beliefs and attitudes of teachers. It was suggested that all of the above three themes help in improving the teacher's performance, deepening understanding, and building confidence in their ability to teach particular subjects (see Table 7.3 below). Each of these categories are explored further below.

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
... my participation in LS has given me different ways of thinking about the teaching process. I now understand that how I think about something is not necessarily how my students look at it. This means that there is more than one process of coming up with the correct answer T6	Receiving knowledge - knowing the difference between knowing the subject I teach and teaching it well	Enhanced knowledge and understanding	Teachers' learning Impact of LS on teacher CK
It is clear that this model plays an important role in increasing performance for teachers. SL2	Increased performance	Improved teaching-related skills	
The LS helped me to be more self-confident and comfortable with my subject area. T1	Confidence Booster	Changes in the beliefs and attitudes of teachers	

<p>The LS has helped me to become more comfortable teaching the Arabic language. T10</p>	<p>More comfortable in teaching</p>	<p>Building confidence in the ability of teachers to teach their subjects of speciality</p>	
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Table 7-3 Perspectives on the impact of LS on the CK of teachers.

Enhanced knowledge and understanding: In this category, both teacher and school leadership groups expressed views that appear to suggest that teachers learn or gain knowledge through their participation in LS. They emphasized that having a deeper knowledge and understanding helps in knowing the difference between knowing the subject one teaches and teaching it well. Each participant group provided examples and scenarios to support their position. For example, a female science teacher with 18 years of teaching experience who had a one-year experience in participating in LS was emphatic in her view that her participation in the LS process helped to deepen her understanding of the subject content:

... my participation in LS has helped me to acquire a deeper understanding of CK and the various methods of understanding the subject matter (T1).

A male teacher participant who also teaches science and has a relatively longer experience in participating in LS (three years) suggested that:

I was a good science student in my school days and have always felt comfortable in my understanding of the subject. However, I am beginning to think differently about the subject matter since my participation in the LS... I think through LS I am developing a deeper sense of science and scientific processes (T7).

Similar views were expressed by the other male and female teachers who participated in the research study. This demonstrates a common or similar understanding by both male and female teachers respectively – illustrating convergence in the data in this category.

On the part of the school leaders, it appeared they were also unanimous in their views and largely agreed with the views expressed by the teachers that LS helps to enhance the knowledge and deepen understanding of teachers in their schools, particularly in reference to subject CK. According to a female school leader with five years' experience overall in the supervisory role, in two of which she participated in LS:

LS helps the teacher to achieve a heightened sense of subject knowledge..., which in turn develop their understanding of the CK of the subject area.... (SL1).

Another school leader appeared to suggest that LS seem to awaken the sleeping giants in the teachers when he noted that:

...their conceptual understanding of what needs to be taught is growing and they are learning more than one way of looking at particular problems....(SL 4).

Again, both male and female school leaders had a common position on this theme – a position which also converges with that of the teachers.

Improved teaching-related skills: In this category, the majority of the research participants agreed that the participation of teachers in LS enabled them to develop skills in all of the LS stages, that is, planning, observation and reflection. The research participants cited different examples to illustrate how their participation in LS is helping to improve their teaching related-skills. For instance, the teachers were generally quite cynical about their old ways of lesson preparation expressing that, although they were doing their best under the circumstance, their old ways of doing things were not good enough to help students learn effectively. According to T3, a female Arabic language teacher with 20 years of teaching experience, “*our work was shabby, and not enough time and attention was spent in our lesson preparation nor in reflecting over our teaching*”. She noted that since the introduction of LS, it appears teachers have started paying a lot more attention to their lesson planning, observation and reflection. Another female participant similarly suggested that “*...our lesson plans were often short and sketchy.*” T4.

Perspectives from the male teachers were not any different. For instance, T9, an Arabic language teacher with nine years of teaching experience and a year's experience in LS preparation mentioned that "... *our old ways of preparing for lessons exposed our ignorance ...*" He added that although he held a Master's degree in the subject area in which he taught, participating in LS was enlightening and helped in enhancing his teaching skills. In his words,

... After participating in the LS, ... we now take our lesson planning and preparation very seriously and are now capable of preparing improved and detailed lesson plans (T9).

In line with these views, T6 noted that:

... our earlier lesson preparation process was a joke... we are now able to prepare better and more detailed lesson plans, especially in collaboration with other teachers... (T6).

Following from the above, it appeared that both male and female teachers had similar views or perceptions about how their participation has helped to improve their teaching-related skill - demonstrating convergence in the data.

The sentiments of school leaders were similar to that of the majority of teachers. One of them observed that the teachers were spending more time in lesson planning now, than ever. According to him:

This is another indication of teacher development... they are beginning to spend more time in planning, observation and reflecting. This means that they are valuing their work more and avoiding shortcuts.... (SL4).

Similarly, there was convergence in the views and perceptions of school leaders, and between school leaders and teachers as well on this subject.

Changes in the beliefs and attitudes of teachers: On the third category, the research participants expressed positive feelings towards their involvement in the LS process as a way of PD. They also noted that such positive feelings were indicative of the impact LS might

have made in their professional lives. Again, different participants cited different examples to support their case. For instance, T11 who was a male science teacher with 17 years' teaching experience, three of which he was participating in LS, noted that:

...we were preparing lesson plan individually but now we are planning in groups in a collaborative manner. This is helping in the teaching-learning process. (T 11).

Another teacher, a female mathematics teacher with 18 years of experience suggested that:

... LS is helping us to stick to what we have planned. This makes the lesson plan format ideal for preparing teaching-learning activity. (T4).

However, some research participants had reservations and expressed some concerns regarding its application in KSA given the context and culture. For example, according to T5:

LS is a helpful process of working collaboratively, identifying problems together and then solving them... However, it will be difficult to implement here because it requires a lot of time and space... (T 5).

Building confidence in the ability of teachers to teach their subjects of speciality: In this final category, the majority of teachers agreed that their participation in LS enabled them to build confidence in their ability to teach their subjects. They cited different examples to illustrate how LS affected their confidence. Two of the outstanding comments made are as follows:

The LS has helped me to become more comfortable teaching the Arabic language (T10).

Participating has helped me to feel a heightened sense of confidence in my ability to explain in detail the concepts of the subject of science to my students (T4).

Therefore, there was some point of divergence in the views of teachers in this category with a participant stating a contrary view or perception to what the majority thought. School

leaders expressed similar positive views and perceptions about the LS process and how it is able to change the beliefs and attitudes of teachers in KSA.

7.4.2 Perceptions of Teachers and School Leaders Regarding The Use of LS in Developing the Pedagogical Content Knowledge (PCK) of Primary School Math, Science, and Arabic Teachers.

This section explores the views and perceptions of the research participants on the use of LS to develop the PCK of teachers. PCK is defined in this research as the combination of CK and pedagogical knowledge which, “represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (Shulman, 1987, p. 8). The views and perceptions are organised into the following categories: the use of best practices, understanding how children learn mathematics and science, making learning active, changes in the use of teaching-learning strategies, as well as changes in teaching methods (using new learning ways of teaching) (see Table 7.4 below). Each of these categories is explored further below.

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
Many students have increased timely feedback after we are using LS which encourage them to participate in the discussing and contribute to sharing feedback effectively. T3	The provision of frequent and timely feedback. Being resourceful or resourcefulness	Use of Best Practices	Enhancing the PCK of teachers
Simulating the real world, for instance, peer-review activities and role play helps to bring the real world into the classroom. T6	Providing new opportunities using real-world examples	Understanding how children learn mathematics and science	
..., we now have a better understanding and appreciation of the challenges facing students in their learning and try our best to make our lessons	Allowing for student participation during lessons	Making learning active	

<p>practical and student-centered. This strategy is proving to be more effective in meeting their needs and it seems to be promoting active learning. T9</p>			
<p>... having an understanding of the practical problems of students helps in designing a teaching style or method that helps them to learn. T3</p>	<p>Acceptance and use of alternative strategies</p>		
<p>Such programmes (LS) lead to the acquisition of greater experience, achieving a deeper understanding of the subject, as well as exchange of knowledge and experience among members of the study team T1</p>	<p>exchange of knowledge and experience</p>	<p>Changes in the use of teaching-learning strategies as well as changes in teaching methods (using new learning ways of teaching)</p>	

Table 7-4 Perspectives on the impact of LS in enhancing the PCK of teachers.

Use of best practice: The introduction of LS in Saudi Arabia suggested that several changes were imperative in order for students in Saudi Arabia to improve their subject performance in particular subject areas including Mathematics and Science on international measures. This meant that all students, henceforth, needed to be able to understand and use these subjects meaningfully in their everyday life activities. The teachers and school leaders identified some best practices that could facilitate how teachers could use LS in developing their PCK. Some of these best practices are explored below.

The provision of frequent and timely feedback. According to T1, a female science teacher with a one-year experience in LS implementation:

Enough can't be said about the importance of sharing feedback with students during the learning process. Setting up checkpoints, offering a variety of formative assessments, and discussing learning in real time are all essential ways and opportunities for teachers to provide useful feedback to students. It is also an opportunity for teachers to receive feedback from students as to how well the lesson went.

Similarly, SL3 a male SL with three years' experience in LS implementation suggested that:

... there has always been an expectation on teachers to provide meaningful and timely feedback to students. However, this expectation has not always been met because teachers originally saw the expectation as daunting and perhaps unreasonable and/or sometimes, unwarranted. This was partly due to the lack of training on the efficacy of the provision of timely feedback and how far this goes to improve the lot of teachers and students.

In this instance, it appears that there was common understanding both amongst teachers and school leaders in the way and manner LS helps in the provision of frequent and timely feedback. This demonstrates convergence in their views about how LS promotes the use of best practice.

Being resourceful or resourcefulness. Here, a variety of responses were given. For example, T6, a female Arabic teacher with a one-year experience in LS implementation simply stated that: “.... *it means thinking outside of the box*” The views of T9, a male Arabic teacher also with a one-year experience concurred with T6, when he suggested that for teachers to be considered a resource they should:

... possess the right qualities and the desire as well as ability to procure supplies or engage in something that would otherwise looked to be an unattainable resource. Some teachers can always seem to find a way to get it done...

School leaders also identified with this position suggesting that it was absolutely necessary because resources are limited even with the amount of wealth they have in KSA. Their collective view is summed up in the view expressed by SL4 when he noted that “... *the one way we can maximise its use is to be more resourceful and prudent in our day-to-day activities*” (SL4). He indicated that this is exactly what LS is seeking to achieve.

The findings here suggested that both teachers and school leaders demonstrated similar understanding of how SL is enhancing judicious use of scarce resources and promoting resourcefulness, which, is undoubtedly an example of best practice.

Collaborating with colleagues. This was also identified as best practice highlighted by SL2, who observed that, “*excellent teachers are earnest learners. They are always willing to spend some time with a colleague, or two and share their opinion on matters that has to do with best classroom practices.*” He argued that this is precisely what the introduction of LS in KSA seeks to achieve. Although SL did not particularly identify this as an example of best practice, they had no objection to it when the researcher raised it with them.

Therefore, the findings indicated that the participants were largely convergent in their views in this category both within and between SL and T groups.

Make learning active: This was another category identified by the participants, but they were quick to add that, “*only effective class teachers are able to do this.*” According to the majority of the respondents, “*students are going to find more impactful takeaways from engaging in lessons rather than simply listening or viewing (T4)*”. Furthermore, it was noted that, “*making learning active also means, offering students opportunities to be actively engage in their learning journeys, ideally right from planning to delivery (T11).*”

The contribution of the SL group in this category was that LS encourages effective classroom discussions. According to SL1, “*through effective classroom discussion, teachers are able to expose students to a variety of opinions and ideas that may or may not be similar to their own thereby making the learning process active.*”

SL3 added that, “*the use of LS in classrooms offers a perfect forum for teaching students to respect others and learn to share information, agree, and disagree in a productive and nonthreatening manner.*”

There was again convergence in the views of participants both within and between groups.

Understanding how children learn their subjects: It has been suggested that understanding both the content, and how students learn that content, is an important quality in effective teaching (Ma, 1999; Stigler and Hiebert, 1999). Therefore, teachers should aim to know what students understand and how they learn, so they can help them integrate new ideas and transform prior conceptions (Shulman, 1987 as cited in Thousand et al., 2004). In this category, the participants explained that LS transformed their perspective of education

to a student-centred one. For example, T8 stated that “*now we consider the bigger picture more.*” Narrowing it to himself, he further explained that “*I now consider where my students are coming from and where they’re going and what my little contribution means in their progression towards that end goal*”.

T2 also mentioned that,

... Like I said, they might know two plus two is four just because they’ve memorised it, but that doesn’t mean they know that they’re joining two groups together. Or when they subtract, they’re taking things away. My role here is awakening such an understanding in them...

She added that,

I think my first few years of teaching, I thought, they have to be quiet, they have to be in a seat, they have to just be doing this and kind of go about it. But, now I use a lot more with math of, Ok, we’re going to put out ten counters. We’re going to turn of them six over. We’re going to use inchworms to measure—and it’s a lot more hands-on; a lot more of the investigations type math where they really have to do it on their own. We’re measuring with inchworms. We’re weighing things. We are using connecting blocks to add things. It’s a lot more hands on. They’re actually doing it and they’re actually seeing it. It helps them. It changes math for them. And they can understand it. It’s just more concrete and more meaningful to the students.

T4 also explained that through LS she learned things about how her students learn Math that surprised her. She explained,

Based on the LS that we did, we learned very quickly that these kids are... we had a hard time getting them to try some other strategies. They are very comfortable with one or two strategies. And, we found that the strategies that they’re comfortable with are a lot of times the same problem-solving strategies that are used across the board regardless of a teachers’ understanding of the math. The kids were very, very reluctant to kind of put themselves out on a limb a little bit and say, hey, there are two or three ways I could do this, but I’m going to take a risk in trying it this way. They are so conditioned to do repeated addition for a multiplication problem and that’s all that we saw. And when we asked them to try and come up with another way to solve that problem, they struggled.

On the part of SL, the participants made the following suggestions: SL 1 explained that,

It [Lesson study] forces you to look for evidence of what they understand in you're doing. That it's one thing to stand up and ask questions and go around and see what they're doing, but it's another thing to base the next step in your lesson on what you see..... you're considering what they're doing and what that means according to what they understand. I'm considering what they show—and what they say and how that represents what they know.

Another SL, SL3 noted:

With Lesson Study, I became aware, as I increasingly walked around the classroom, listening, for evidence of student-learning. I really started to pay attention to what the kids were saying to each other. Just by what I could hear, I would figure out where somebody was not understanding a concept, or where one student would be grasping a concept easily.

As seen from all of the above, in this instance, the views of participants appeared to converge.

Changes in the use of teaching-learning strategies: In this category, the research participants identified the acceptance and use of alternative strategies as fundamental. The teachers identified the following contributions of LS in their use of teaching-learning resources, for example, “..., *LS helps in understanding the importance of linking subjects being taught to real life... (T5)*”. He also noted that “*I have realized that providing new opportunities for teaching and learning helps with better class discussions and helps some student to participate actively during lessons...(T5).*”

Furthermore, it was suggested that:

Our lessons now are better than the earlier lessons because we are using better teaching-learning strategies when compared to the earlier lessons... For example, I was able to use ants as teaching-learning resources in one of my science classes... I did not do this in the previous year when I taught the same topic. (T1).

The above statements were echoed by the school leaders (SL) when they observed that:

... in previous practices, the teachers did not rely much on teaching aids, but now teachers bring the necessary materials and create an environment for the

students to use them in class during lessons... So, even though the methods may be the same, there is huge improvement in the delivery method...SL2

Changes in teaching methods (using new learning ways of teaching): in this category, the majority of teachers (T) identified that LS provides some real advantages in using new methods which enhances their PCK. For example, T2 suggested that:

... The LS model contributes positively to the planning process, and helps to identify alternative teaching methods that will be suitable for the learning needs of the different type of students... (T2).

Contributing to how this is possible, another teacher observed that,

... The LS model helps us to use alternative teaching strategies for students with learning difficulties/disabilities (T4).

Another teacher participant added that:

The LS model emphasizes best practice which gives all students a learning opportunity that suits each individual student, taking due account of his abilities and interests ... (T8).

Similarly, all SLs indicated that teachers' participation in LS has a positive impact on them and enhances their PCK. The following are some examples of their expressed views on how LS helps in modifying teaching methods:

The teaching skills acquired by teachers include the ability to professionally analyze content, development of long-term and short-term objectives, time management, diversification of strategies and inclusive planning according to student types and content analysis in service of the long-term objectives (SL3).

SL4: The LS model contributed positively to the planning process, alternative teaching methods and determining the respective intelligence levels of learners (SL4).

However, there was a divergent view expressed by T5 who did not think that the impact of LS is that positive in increasing the PCK of teachers. He noted that:

I don't think there is any meaningful impact of LS on improving my PCK of providing me with alternative teaching methods... I think others think otherwise because it is new to us... (T5).

In summary, the section has explored the views and perceptions of the research participants on the use of LS to develop the PCK of teachers. The views and perceptions are organised into the following categories: the use of best practices, understanding how children learn Mathematics and Science, making learning active, changes in the use of teaching-learning strategies, as well as changes in teaching methods (using new learning ways of teaching). Overall, there was a convergence in the majority of views in both T and SL across the identified categories, except the last one where there was some divergence in views.

7.4.3 Building a Collaborative Learning Community

It was identified that participation in the LS provided the teachers with a new opportunity of building a more collaborative learning community in the school. It was argued that not only LS created a platform for the participating teachers to work together in order to improve classroom practices; but it also helped to improve collaboration between teachers and students as well as teachers, students and school authorities. The results regarding the impact of the LS on building a collaborative learning community were therefore organised into four categories, namely, enhancing the collaborative work culture between teachers; enhancing collaboration between teachers and students; enhancing collaboration between teachers, students and school administration as well as breaking the culture of isolation on the part of teachers (see Table 7.5 below).

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
... LS has given us the opportunity to sit down with colleagues and observe what we do as a collective... we are usually in our own environments and we don't even know that other people are doing...not having the opportunity to watch others corroborate what you do is not the best... experiencing other teachers teach the same thing differently helps you. T3	Working with peers and getting feedback - peer observation Student learning	Collaboration between teachers Collaboration between	Building a collaborative

<p>... having the opportunity to work collaborative with my colleagues and to gain their inputs when the observation is complete is beneficial. I don't know everything in my subject area... so, working with others makes my job a little easier because of the support they provide. T9</p> <p>Prior to our participation in the LS, our teaching was characterised by teacher-centred methods. Now, we have shifted our teaching to a more student-centred learning method which allows for student participation rather than see them as passive recipients of knowledge. T2</p> <p>... we are definitely working better together as a team now more than ever, taking on board the views of everyone, that is, students, teachers and school leaders... this means that everyone is getting to know more about our roles and the roles of each other in the teaching and learning process...T7</p>	<p>Collaboration in research lesson step</p> <p>Enhanced peer support and able to seek help from superiors</p>	<p>teachers and students</p> <p>Collaboration between teachers, students and school administration</p> <p>Breaking the culture of isolation</p>	<p>learning community</p>
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Table 7-5 Perspectives on the impact of LS in building a collaborative learning community.

Collaboration between teachers: In this category, both teachers (T) and school leaders (SL) expressed their opinion about it with the majority of them suggesting that the LS has enhanced a collaborative work culture between the teachers in the schools. Some of the teachers were straightforward in their views. For example, T2 and T3 both female teachers mentioned respectively that: “... *the LS activities enhance teachers’ ability to collaborate with colleagues...*” (T2); and that, “... *the LS model helps team members to embrace teamwork...*” (T3). Others were more elaborate in their views, for instance, according to T11:

To be honest, I've never before known collaborative work, but now I am able to work collaboratively with colleagues..., the benefits from this are many including gaining more experience and becoming more comfortable than ever before to share or exchange ideas in a groups (T11).

It was further suggested that the notion of collaboration between teachers also includes peer observation. For instance, T1 suggested that:

Prior to my participation in the LS, I thought it was not practicable to teach effectively using student-centred approach, but my participation in the LS programme has change my perception... The LS has helped us to stick to what I plan to teach because I know my peer observer knows what I am supposed to be doing... This brings about congruence in the lesson planning process and its execution... (T1).

In addition, another teacher mentioned that:

Until the introduction of the LS programme in my school, I use to work on my own, and I was always shy to engage with my colleagues. But now I am more confident about reaching out to other teachers who are teaching the same or similar subjects in the school... (T9).

Similar sentiments were expressed by SLs with one of them suggesting that “... *this was one of the reasons they introduced LS in the KSA*” (SL1). Another SL confirmed the conviction that the use of LS enhances collaboration between teachers because of the numerous opportunities it provides for teachers.

SLs suggested that they regard peer observation as something useful and of high value. They argued that through peer observation, teachers are able to engage in rich professional discussions around a particular subject matter of interest as well as exchange feedback openly – that is, provide constructive assessments of what is being taught. One of the SLs noted that:

... taking part in the LS enables teachers to work with colleagues in a collaborative manner, pay visits to each other's classes and observe how they teach and how their students learn..., this is something no teacher had ever done...(SL4).

From the above, it appeared that there was a common understanding of how LS has encouraged collaboration between teachers.

Collaboration between teachers and students: In this second category the participants mentioned that such collaboration enhances more effective teaching and learning. For example, T11 simply noted that “*there was no collaboration like this, I mean between us teachers and our students....*” In his contribution, T4 added that, “*it was unthinkable to find teachers and students sitting together to discuss and plan activities that will promote effective teaching and learning. We were developing the lessons as teachers and implementing them without considering the actual needs of the student....*” (T4).

However, there were dissenting views with some of the research participants, both teachers and students suggesting that they still do not see much collaboration going on between teachers and students in the design and implementation of the lessons. For instance, one of the teachers said that:

LS may be helpful in so many ways but I don't still see how it is able to help me in collaborating with my students (T5).

Furthermore, the majority of SLs suggested that although teachers are beginning to involve students in their lesson preparation, there is still a long way to go in order to achieve meaningful collaboration between teachers and students. A standout example was that,

... we are beginning to see that some of our teachers are allowing for the voices of students to be heard in their teaching and they are actively encouraging this.... However, the majority of teachers are still very conservative in the relationship with students. I think this partly cultural because our culture makes that distinction and teachers expect due respect from their students and nothing else. Therefore, they don't see how they should work collaboratively in order to promote effective teaching and learning (SL1 and SL4).

There was therefore divergence in the views of the research participants in this category. Although they all recognised the need and merit of teachers and students in collaborating, some felt it was not yet pervasive as a practice in the KSA.

Collaboration between teachers, students and school administration: In this category, not all research participants recognised this. However, those who did suggested that LS also promotes collaboration between teachers, students and school administration in a way unlike

any other method known to them. The consensus here was that LS helps in getting all three to devise ways of working together in harmony as stakeholders. According to T10, for example,

The LS model provides guidance as to how to engage in collaborative work, and the benefits of effective engagement by all so that everyone becomes partners in success or subject to critical comments

The above quote appeared to encapsulate the general view of the research participants.

Following from the above, the findings indicated that LS helped to minimise the isolation and shyness that persisted among them. Participation in LS thus enhanced their coherence and interpersonal relationships. The participants frequently indicated that after participating in the LS, they started to love, respect, interact with, talk to and work with one another. It also enabled them to network with their colleagues and they have become friendlier with one another after participating in the LS activities. However, there were also divergent views, given that some participant appeared unsure if LS is actually achieving all the above after all.

7.4.4 Contribution of LS in Breaking the Culture of Isolation

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
<i>We are used to working on our own during our lesson preparation and at the time of teaching... T1</i>	Working in isolation	Breaking the status quo	Contribution of LS in breaking the culture of isolation
<i>"We are now able, through the LS model, to ask for assistance from our colleagues and superiors... T10</i>	Enhanced peer support and able to seek help from superiors	Working collaboratively	
	Openness and transparency	Embracing democratic principles	

<p><i>"The LS model has enabled us to be more open about what we are doing at any given time to other members of the team... T4</i></p> <p><i>We are used to working on our own during our lesson preparation and at the time of teaching. With LS encouraging us to work collaborative, it has helped us to break this barrier ... T1</i></p>	<p>Working within boundaries</p>	<p>Other barriers that contribute to isolation</p>	
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Table 7-6 Perspectives on Contribution of LS in breaking the culture of isolation in Saudi schools.

Breaking the culture of isolation: This theme was identified in relation to how LS helps in building a new collaborative learning community. Under this theme, the majority of teachers (T) stated that they have had positive experiences with the use of LS and that it has helped them to break the culture of isolation that existed within the teaching community. The participants admitted that the existing culture is that all of the teachers work on their own during lesson preparation and teaching. They further suggested that this was very isolating and that the introduction of LS is a welcome move by the Saudi MoE. Indeed, with the introduction of LS, teachers are now encouraged to work collaboratively, breaking this barrier that kept them isolated. Some examples of such sentiments expressed include:

The LS model has enabled us to be more open about what we are doing at any given time to other members of the team. This is helping us to change our way of doing things both in and outside the classroom. Above all we feel less isolated... (T4).

We are now able, through the LS model, to ask for assistance from our colleagues and superiors which is something we would never have done some time ago. Therefore, LS is helping us to break the culture of isolation (T10).

This is helping us to change our way of doing things both in and outside the classroom. LS is helping us to become more accountable for decisions we take and things we do and above all we feel less isolated... T11.

Furthermore, all SL agreed that participating in LS activities helps to build a collaborative learning community at schools. Some examples of their views on how it helps in breaking the culture isolation among teachers include:

There is more collaboration amongst teachers now because they prepare the lesson plans in collaboration with others and they observe each other's ways of doing things. During observation, they check whether the lesson has been implemented as planned and they provide feedback during debriefing sessions. All these activities are done in groups and involve communication at all times. This helps in breaking the culture of isolation... (SL1).

Another SL noted that:

I can say that LS has helped to unblock most of the barriers that were blocking teachers from collaborating with one another or working in teams. Some of these barriers were the negative feelings that the teachers were holding regarding being observed, the fear of being evaluated, or the fear of being belittled by colleagues... LS has helped us to consolidate our working relationships and build new ones... these are all helping us break the culture of isolation which was facing teachers... (SL3).

However, some teachers (T) argued that participating in LS activities does not always help to build a collaborative learning community at schools. Their views are captured below:

We have not noticed any positive impact of LS towards building a collaborative learning community in our school because there are difficulties facing the implementation phase of LS which is also leading to difficulties in build collaboration amongst teachers (T5).

This theme is significant in many respects. Principally, it helps to identify and highlight the existence of the culture of isolation and its associated dangers within the teaching profession in KSA. Although some of the research participants expressed divergent views from the position of the majority, this should be a point to note going forward. It is also key to mention the possible mental health impact of this culture of isolation on teachers. LS can; therefore, be used as a significant tool in enhancing the mental health of teachers in KSA.

7.4.5 Benefits of the LS Model in the KSA

The results regarding the benefits of using LS were organised into three categories, namely, improving teacher performance, improving teaching practice, and improving student outcomes (see Table 7.7 below).

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
<p>... the LS model has helped me to introduce changes into my daily activities, thus making me more capable of formulating my long term objectives and fulfilling them... However, support by the school management is a must, taking into consideration all impediments to timely execution, including insufficient training of some teachers on the model's execution mechanism". T3</p> <p>This model enhanced teachers' motivation to achieve professional development, realizing that professional development is part and parcel of their duties and responsibilities and an integral part of the teaching profession. SL3</p> <p>... Such continuous professional learning involves utilizing personal experiences and knowledge as well as breaking free from the cocoon of our individual perspectives of subjects of specialization helps in widening or horizons...T8</p> <p>... It has helped me to acquire an enhanced level of self-confidence with respect to teaching the Mathematics syllabus...T2</p> <p>LS makes the student the cornerstone of the teaching and learning process and has a considerable impact upon student learning. ... it channels ideas of the thought of a whole team into producing the best possible method of lesson presentation in terms of quality, professionalism and skill, all with the sole aim of improving student outcomes...T7</p> <p>This new model, which motivates both teachers and students, is a very good process and a new teaching method that I'd like to see it implemented in all schools of KSA. T2</p>	<p>Ability to link daily teaching practices to the practical realities of students and real life situations</p> <p>Changes in motivation and sense of effectiveness</p> <p>Deepening understanding</p> <p>Building confidence in their ability to teach the subject</p> <p>Improving student outcomes</p> <p>Motivates teachers and students</p>	<p>Teacher performance</p> <p>Teaching practice</p> <p>Student learning outcomes</p> <p>Changes in motivation and sense of effectiveness</p>	<p>Benefits of LS</p>

Table 7-7 Perspectives of participants on the benefits of using LS.

Improving teacher performance: In relation to this category, the majority of teachers (T) provided positive responses indicating that there is improvement in the performance of teachers as a result of their participation in LS. They explained that this is noticeable in the ability of these teachers to link their daily teaching practices to the practical realities of students and real life situations. T2, for example, simply stated that: *my participation in LS has increased my level of teaching performance (T2)*. Another example cited in support of this view was that *"LS has provided teachers with numerous resources which are beneficial to them and can help to enhance their performance" (T11)*.

Other views expressed include the following:

The greatest benefit for me is that it has renewed my love and desire to teach the Arabic language... I have become more passionate in carrying out my day-to-day activities as a teacher which was not always the case before my participation in the LS programme... (T8).

The views expressed by T1 probably provide some underlying reasons. According to her:

... participating in LS has helped in the acquisition of more experience, a greater understanding of the content of the subject through knowledge exchange among the participants... this results in better teacher performance in class and a good delivery of content knowledge which is reflected in enhanced student learning... (T1).

In the view expressed by T4, the benefits are limited to newly qualified and inexperienced teachers. This provides a different perspective to the above narrative which was largely seeking to generalize the benefits of LS to include all teachers. In her view:

LS enhances the performance of new teachers and less experienced teachers most of all, by providing them with the opportunity to quick integration into a motivated teaching environment... (T4).

She, however, conceded that some experienced teachers could also benefit from LS depending on their level of experience. She said that *"LS can support some experienced teachers by providing them with the opportunity to maximize performance and incorporate their experiences into their teaching" (T4)*.

On the part of SL, the majority also agreed that LS has a positive impact on teacher performance. Some of their views are captured below:

LS model helps teachers explore the behavioral objectives that students are expected to learn during the execution stage and look for the appropriate strategies that take into account individual differences among students and students with learning difficulties/disabilities, which has a direct impact in terms of enhanced teacher's performance and improved application of teaching strategies (SL2).

LS model, through its emphasis upon professional education communities and school-based professional development, is greatly impactful in terms of enhanced teachers' performance and formation of lasting connection and cooperation between team members, who are encouraged to embrace the team spirit (SL3).

Following from the above, it appeared that participants across teacher and school leaders' groups identified with the notion that LS helped in enhancing teacher performance. The consensus is that LS will play an important role in increasing performance of teachers if carried out appropriately.

Improving teaching practice: In this category, the participants identified that LS has helped them to make changes in their motivations and develop a sense of effectiveness, deepen their understanding and build confidence in their ability to teach the subjects. On making changes in their motivation and helping to develop a sense of effectiveness, the majority of the teachers who participated in the research acknowledged that they recognize this in themselves. According to T4:

LS is helping us to reflect more on our role as teachers and make changes to our motivations as professionals. In fact the post-lesson observations and feedback we get from colleagues also help us to acquire a heightened sense of effectiveness (T4).

On the issue of deepening understanding, all participating teachers seemed to have recognised how LS has helped to deepen their understanding in what they teach. For instance, T6 mentioned that:

LS is most effective in deepening the understanding of teachers because of the collaborative component which provides them with opportunities to share good practices and learn from them... (T6).

Lastly, the participating teachers suggested that LS helps in building their confidence in their ability to teach their subjects. According to T10:

Speaking for myself, I can say that I am much more confident in my ability to handle my subject and I guess it is the same with my colleagues... LS is a confidence booster, she added.... (T10).

On the part of SL, they all agreed that LS promotes the three identified issues under this category – that is, make changes in the motivations of teachers and develop a sense of effectiveness, deepen their understanding and build confidence in their ability to teach the subjects. Below are the expressed views:

It is an effective model, but for its proper implementation teachers need to apply themselves at work and to read extensively to accumulate the required information. This is what helps in deepening their understanding of the subject area... (SL2).

Another SL contributed to this when he noted that:

This model enhanced teachers' motivation to achieve professional development, realizing that professional development is part and parcel of their duties and responsibilities and an integral part of the teaching profession. Therefore, continued professional learning, utilization of experiences and knowledge and breaking free of the cocoon of their respective subjects of specialization, collaborative learning, knowledge, and experience sharing and recycling lead to sustainable professional development and continuity within the work environment (SL3).

According to T10:

Peer coaching and experience exchange are beneficial to all as the discussion of lesson content and review of all ideas help us determine the best and soundest method of presenting the information to the student in a correct, easy and creative manner. For example, a colleague gave us the name of a book in grammar that he thinks is helpful to a freshly appointed school teacher, so we all ordered it for its significant impact upon our teaching performance.

In this category, there was convergence both within and between teachers and school leader groups who participated in the research.

Improving student outcomes: In this category, the majority of teachers (T) stated that LS helps to improve student outcomes primarily because it makes students the cornerstone of the education process. Some examples of the expressed views of teachers include the following:

LS provides students with varied ways of learning and understanding the subject they are studying (T1).

LS has a considerable impact upon student learning as it channels ideas of the thought of a whole team into producing the best possible method of lesson presentation in terms of quality, professionalism and skill, produced by a team that meet more than once to determine the questions and the steps of lesson presentation (T7).

LS model helps develop research, enhance preparedness and deepen understanding of students, encouraging team-work, role distribution and evaluation of material learned (T11).

On the part of SL, the majority also indicated that LS improves student outcomes. Some examples of their views include:

LS helps the student to discover the information by himself, using appropriate tools and varied methods, thus developing his ability to look for information, deepen his understanding of the lesson and making information thus acquired more lasting (SL1).

LS gives students a sense of initiative and makes them effective elements in the lesson by activating several strategies, enhancing the student's self-confidence and polishing their skills (SL4).

Changes in motivation and sense of effectiveness:

Because of post-lesson observations, teachers acquire a heightened sense of effectiveness (T4).

LS model helped me understand that motivation leads to effectiveness and further helped me develop such motivation (T6).

I'm excited, having completed the LS course, and my excitement has been picked up by my students, who have become active participants (T8).

Collaboration with colleagues helped me enhance my sense of motivation, which is a sense I've never had before the execution of this programme (T10).

It is an effective model, but for its proper implementation a teacher needs to apply himself at work and to read extensively to accumulate the required information (SL2).

This model enhanced teachers' motivation to achieve professional development, realizing that professional development is part and parcel of their duties and responsibilities and an integral part of the teaching profession. Therefore, continued professional learning, utilization of experiences and knowledge and breaking free of the cocoon of their respective subjects of specialization, collaborative learning, knowledge, and experience sharing and recycling lead to sustainable professional development and continuity within the work environment (SL3).

Overall, this section has explored the benefits of LS. Broadly, three categories have been identified – that is, teacher performance, teaching practice and student learning outcomes. It can therefore be argued that although there were some divergent views expressed under some of the categories, the participants were largely convergent in their views that LS as a PD tool has been beneficial.

7.4.6 Challenges of the LS Model in the KSA

The results regarding the challenges of using LS are listed in Table 7.8 below. While some were common to both teachers and school leaders; other themes were unique to each group and some were student-related.

<i>Transcript excerpt</i>	<i>Initial (open) code</i>	<i>Categories</i>	<i>Theme</i>
... we have insufficient time for collaboration in our schools as required by LS... for instance, most of the teachers in primary schools have to have 5 hours contact time in class daily. If they are contracted to work 7 hours in day, that means that there is very limited time for any collaborative work with other	Time constraint	Teaching related (teachers)	

<p>teachers as required in LS... This is a major difficulty with implementing LS. T5</p> <p>Some teachers still lack both CK and PCK as a result of insufficient support and inadequate training. This impacts negatively on the quality of LS implementation...SL4</p> <p>I think that some teachers need more training programmes about implementing LS effectively because some of them do not have sufficient understanding of LS. SL1</p> <p>...effective implementation of LS requires 100% administrative support... this influences the quality of the LS and has to be continues, which is not my experience here so far... T12</p> <p>... I think our LS programme was rushed because our activities do not looked well planned. For instance, they use a day to train us on things that should take about a week... I think they need to plan for the long-term for LS to work effectively...T12</p> <p><i>... using LS is expensive in terms of time and required administrative resources.. for example, some teachers may not have sufficient understanding of LS and may need more training programmes about implementing LS effectively... T5</i></p>	<p>Insufficient support</p> <p>Misconceptions of LS</p> <p>Bureaucracy</p> <p>Requires long-term planning</p> <p>Lack of policies and procedures</p> <p>Sustainability</p>	<p>Administration-related (school leaders)</p> <p>Policy related challenge</p>	<p>Challenges of LS</p>
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Table 7-8 Perspectives on the challenges of using LS in Saudi schools.

Policy related challenge: Sustainability was identified as the main policy related challenge to LS in KSA. It was conceptualised simply as the potential of the LS programme to continue over a long period of time. In this category all the research participants indicated

that they were unsure how long the programme would continue in the current schools in which it was implemented and how many more schools would pilot it. It was also suggested that LS is still being implemented as a discrete and separate programme for now. The question asked was about the time it will be mainstreamed into the entire education system. The following were views expressed by the research participants: “*For LS to be sustainable here in Saudi Arabia, I think it should be adapted and made rooted in our culture...*” (T1).

Another teacher suggested that “*... making LS sustainable means that it has to be made an integral part of the professional lives teachers...*” (T9).

Furthermore, a school leader (SL) noted that “*... making LS sustainable in this country is certainly going to be a challenge, as it requires the shift in cultural view toward professional development*” (SL1).

Teaching related constraints: In this category, participants identified time constraints, insufficient support, and general misconceptions of the LS programme as the common main challenges. Among these common main challenges, female teachers appeared to be affected even more. In relation to time, the voices of teachers were dominant in the views expressed. Some examples from teachers include the following:

... LS requires time and most of the teachers do not have time for working together (T2).

Another teacher mentioned that:

... time is the biggest challenge for me because oftentimes it is difficult to find free time to conduct meetings if you want to collaborate with other teachers... therefore, the LS initiative is a brilliant idea but our times do not allow us to do so (T6).

In relation to insufficient support, the participants, again mostly teachers, suggested that:

... teachers lack sufficient support and resources which will help them in their implementation of LS... (T9).

The general understanding was that such lack of support impacts negatively on the quality of LS. Furthermore, the participants admitted that there is still some lack understanding or misconception of the LS programme. According to T12:

"Some teachers still lack sufficient understanding of the purpose of LS which is emanating as a result of the lack of appropriate training".

On the part of SL, the following views were expressed:

"The challenge is insufficient time for collaborative LS activities at school. Schedule time is limited in primary school just seven hours and most of the teachers work in class for five hours. This is a major difficulty with implementing LS" (SL2).

"The majority of the teachers suffer from a lack of content knowledge and content pedagogical knowledge when implementing LS resulting in low benefits from LS" (SL3).

"I think that some teachers need more training programmes about implementing LS effectively because some of them do not have sufficient understanding of LS" (SL4).

Administration-related (school leaders): In this category, the participants identified that bureaucracy, lack of policies and procedures as well as the requirement of long-term planning. In relation to bureaucracy, the consensus was that "... one needs to go through a lot before you're accepted to join the LS programme even though we are told it is mandatory. It will be easier if this is made straightforward..." (SL1)

... At the moment there is nobody in charge of the LS programme in our district. This is one of the major challenges. I think that there's interest in the programme on the part of teachers and students, but we don't have an administrative leader who will take charge of the LS programme and encourage participation across schools... Honestly, this is affecting the enthusiasm of the teachers about the programme (SL2).

Regarding lack of policies and procedures, the participants were of the view that this is typical of Saudi Arabia at the moment in most areas. It was suggested that in the country's quest to meet its Vision 2030 targets, it appears some policy decisions are rushed,

particularly in the education sector – one of which is the implementation of the LS programme. According to T7:

You will think that with our country's worth of resources, we will have everything we need, when we need it. But unfortunately it is not always the case. For example, as a result of the lack of policies and procedures we sometimes don't have printed materials necessary for LS practice.

A school leader (SL) mentioned that:

... the MoE is trying their best to catch up with happens in our schools. I admit the LS programme was rushed but I guess the thinking behind it was that we could adopt LS programmes from other countries. Now, we realized what we need to do is adaptation so that it fits into our culture and context... all these considerations are partly responsible for the gap in policy and procedure.... (SL1).

Closely related to the lack of policies and procedure is the challenge of long-term planning. Regarding this theme, the participants again were unanimous in their views and concerns. A quote that captured these views and concerns is that:

I think we need to have a long-term plan for the LS programme... this plan should be made up of views of all stakeholders including teachers, students, administrators and policy makers. If we are able to do this and plan for the future, this will be better for all of us and will lay a solid foundation for the successful future implementation of the LS programme... (SL3).

In summary, this final section has explored the challenges of implementing LS in the KSA. Bureaucracy, teaching related challenges, policy related challenges as well as administrative-related challenges were identified and explored. It can, therefore, be concluded that while the programme has been seen by many to be a good one, its future success depends largely on how the above identified challenges are addressed.

7.5 Chapter summary

This chapter captures the qualitative findings of the research, specifically under Section 7.4. In summary, the qualitative data are analysed based on six identified thematic areas – that

is, CK, PCK, building a collaborative learning environment, elimination of culture of isolation, benefits of LS, as well as challenges of LS as a PD tool in KSA. Across the board, there were some points of convergence, divergence and complementarity both within and between the views of teachers, and school leaders. For instance, there were divergence in the views of participants on the status of CK amongst teachers. Conversely, there was convergence in the majority of views amongst both teachers and school leaders regarding the use of LS to develop the PCK of teachers.

The chapter indicated that as much as LS appears to help in minimising isolation amongst teachers, some of the research participants across both teacher and school leadership categories were not sure about the degree to which this is effective. They called for the need for further empirical research along this thematic area to make this finding conclusive particularly given the link between isolation and mental health related challenges in other contexts. Finally, the section identified some benefits as well as challenges of LS as a tool for PD in KSA. This chapter therefore provides a solid background for the discussion chapter, where these findings will be discussed alongside the existing literature and the quantitative component of this study.

Chapter 8 Discussion

8.1 Introduction

The two preceding chapters, 6 and 7, presented the statistical findings concerning the exploration of the perceptions of primary school Saudi teachers in applying the LS Model for teachers' professional development, and the results of interviews concerning teachers' perceptions towards the LS model respectively. This chapter aims to provide a discussion and interpretation of the findings gained from both chapters. Firstly, it compares the data analysis and results of from both quantitative and qualitative data seeking to highlight areas of convergence, divergence and complementarity. Secondly, it provides a thorough debate of these outcomes in relation to the existing literature, again, highlighting convergence, divergence and complementarity.

8.2 Summary of research findings

Although Yoshida's (1999) study represented a landmark piece of research outside Japan, many other researchers have explored the nature of LS and its implications as a method of teacher professional development in other contexts outside both Japan and the US. The influence of this research on how teachers now perceive LS cannot be overemphasized. Yet, particular contexts still lack empirical research that will help shape policy and provide suitable solutions to the problems teachers may be experiencing about LS. It is against this backdrop that this current study is considered hugely significant. This current study explored the perspectives of teachers on their teaching, including content and pedagogical knowledge, as well as LS as a model of collaborative teacher development in Saudi Arabia. This section provides a summary of the key research findings based on the key research questions.

- 1) *What are primary school teachers and school leaders' perceptions of the impact of LS on developing content knowledge of Maths, Science and Arabic?*

Regarding this RQ, the overall findings of the qualitative component of this study demonstrates that LS has impacted on the teachers' CK in the following ways: enhancement in their knowledge and understanding, improvement in their teaching-related skills, changes in their beliefs and attitudes as well as building confidence in their ability to teach their

subjects of speciality. This outcome was supported by the outcome of the quantitative component of the research where the majority of participants strongly agreed that the LS enhances the CK of teachers.

2) *What are primary school teachers and school leaders' perceptions of the impact of LS on developing pedagogical content knowledge of Maths, Science and Arabic?*

The overall findings of the qualitative aspect of this study showed that LS enhances the PCK of teachers through the following ways: the use of best practice, making learning active, understanding how children learn their subjects, making changes in the use of teaching-learning strategies as well as making changes in teaching methods (using new learning ways of teaching). From the quantitative data, the majority of research respondents indicated their strong agreement regarding the perceptions of teachers that LS enhances their PCK.

3) *How does participation in LS influence school-based collaborative learning communities?*

For this RQ, two substantive findings were identified. The first key finding showed that LS fosters collaboration in a number of ways. For instance, LS is able to help build a collaborative learning community throughout schools. Firstly, through collaboration between teachers – that is, working with peers and sharing ideas, class visitations, peer observation, and increasing collaboration. Secondly, LS is able to help build a collaborative learning community through collaboration between teachers and students – that is, using student-centred teaching approaches, allowing for children's participation in lesson planning and delivery, and allowing for the voices of students to be heard. Finally, LS is able to help build a collaborative learning community through collaboration between teachers, students and school administration. This means that LS helps in building partnerships and working together as a team as well as effective engagement through building partnerships.

The second substantive theme from the research findings for RQ 3 demonstrated that LS also contributes to breaking the culture of isolation through breaking the status quo, working collaboratively, embracing democratic principles, and challenging other barriers that contribute to isolation. The above findings are in tandem with the outcome of the quantitative dimension of this study which shows that there was a strong agreement in the perceptions of teachers regarding LS helping to build a collaborative learning community.

4) *What are the perceived benefits of implementing LS in primary school context?*

The benefits identified in the qualitative component of this study are as follows: enhancement in teacher performance, adoption of better teaching practices, improvement in students' outcomes as well as making desired changes in motivation and sense of effectiveness in the classroom. These findings strongly agreed with the quantitative outcomes regarding the perceptions of the teachers about the benefits of using LS.

5) *What are the perceived challenges in implementing LS in primary school context?*

The following findings were identified as the challenges of LS model in the KSA. Firstly, there are teaching related challenges. These included challenges particular to teachers such as time constraints, time for working together, time to conduct meetings, schedule time, insufficient support and training, lack of resources, misconceptions of LS, lack understanding of the purpose of LS, lack of CK and PCK, negative attitudes about LS among some teachers, lack of training programmes. Secondly, there are administration-related obstacles. These included challenges in relation to bureaucracy from administration, bureaucracy from educational authority, lack of support from the top, lack of long-term planning. Finally, there were policy related challenge. These challenges included the lack of policies and procedures, gaps in policy and procedure, sustainability, the need for a shift in cultural views. The above also tallied with the quantitative research outcome which indicated agreement regarding the perceptions of teachers about the challenges of using LS in the KSA.

The following sections discuss these findings in relation to the existing literature.

8.3 The perceptions of primary school teachers and school leaders regarding the use of LS in developing Pedagogical Content Knowledge (PCK) of Math, Science, and Arabic

The research explored the perceptions of teachers and school leaders regarding the use of LS in developing the PCK of teachers. As demonstrated in the preceding section, there is convergence in the findings from both quantitative and qualitative data rather than divergence. For instance, the research findings from the quantitative data suggested that most participants scored the scale items in this dimension as “strongly agree”. This means that most of them expressed their willingness to use the LS model to develop their PCK and to use it in their teaching. The research findings further showed that the participation of teachers in the LS model has been helpful in developing the following aspects of their PCK – that is, ensuring that they have sufficient knowledge of the basic concepts that students are expected to learn in the subject, and that they have a deeper understanding of the scientific content related to their field of specialization as well as being able to establish the scientific links between their field of specialisation and other fields, and the ability to link the subject with the student's real life.

Similarly, the results from the qualitative data indicated that through the adoption of LS, teachers are utilising new strategies in their lesson planning. Furthermore, the teachers and school leaders indicated that the adoption of LS encourages collaboration thereby raising their PCK as they plan lessons with other teachers. The teachers also highlighted the significance of collaborating with other teachers through LS suggesting that collaboration amongst teachers in schools promotes the sharing of best practices and enhances student achievement.

In relation to the existing literature, these research findings match those observed in earlier studies. For example, the findings are similar to the research outcomes reported by Dudley (2013) who concluded that LS improves the ability of teachers to see and assess the needs and motivations of their pupils. He also demonstrated how the purposeful, collaborative processes of LS allow teachers to use invisible tacit knowledge. In addition, the findings of this study are in agreement with Lewis et al. (2009) who found that educators used LS to

construct their knowledge of Mathematics and its PCK, their ability to work together, and the quality of teaching materials, thereby offering an "existence evidence" for the efficacy of LS outside Japan. Along a similar line, Cajkler et al., (2014) emphasised that LS enhances students' knowledge and cooperation amongst teachers help them to create less teacher-centred strategies as well as develop a greater feeling of teacher community. Finally, the findings of this study corroborate the ideas of Latifa (2019) who showed that in teaching EFL, lecturers had a positive perception of using LS to improve PCK and stressed the effectiveness of LS in improving EFL teaching pedagogical skills.

This discussion demonstrates a convergence of the research outcome with the existing literature across different countries.

8.4 The perceptions of primary school teachers and school leaders regarding the use of LS in developing Content Knowledge (CK) of Math, Science, and Arabic Teachers

Based on the findings of this study, the majority of the teachers expressed the view that they are happy to use the LS model to develop their CK. The evidence from the quantitative data, for instance, demonstrated that most participants scored the scale items in this dimension at "strongly agree" level. In addition, the outcome of the qualitative data indicated that teachers felt that they are improving their performance, deepening their understanding, and building their self-confidence as result of their involvement in the implementation of LS to teach. Specifically, teachers expressed that their participation in the LS model has been helpful in the following aspects: using active learning strategies in teaching, employing technology in teaching, providing students with various learning methods, using various and multiple formats for evaluation, using alternative teaching strategies for students with learning disabilities, and understanding how students learn the subject they are teaching. Teachers, and school leaders as well also reported that the collaborative aspect of LS increases their CK as they planned lessons with other teachers.

The results of this study will now be compared to the findings of previous work. Meyer (2006) pointed out that educators in middle school thought that their CK improved through

working with other educators involved in the LS process. Mitcheltree (2006) and Sitton (2006) similarly indicated that educators were satisfied with the impact of LS on their CK noting that educators' understanding of material improved during each stage of the LS process. This also agrees with the findings of Björk and Pettersson-Berggren (2015) which suggested that LS is a structured and powerful model for developing the CK of teachers and improving their practices. The results of Fernandez (2009) offered further proof that LS has generated opportunities for educators to develop their CK and PCK at the same time.

In other research, Hunter and Back (2011) investigated how LS can be used as a vehicle for promoting and sustaining PD with teacher networks. Based on their results, educators were encouraged to embrace approaches to mathematics teaching that are aligned with the variables recognised as efficient mathematics pedagogy through the method of collaborative lesson planning, observation and discussion – that is, the required steps in LS. They also demonstrate how LS can help educators participate in a collaborative network, improve their understanding of content, and reflect on their teaching practices. All of these findings were observed in this present study.

Finally, the findings of this study are consistent with the findings of Acquah et al., (2013) who reported that teachers' competencies had improved in knowledge of subject matter, lesson planning, lesson preparation, and teaching material development and usage. There were also some recommendations made including that of maintaining the existing co-operation in education between Ghana and Japan so that more teachers could be trained by Japanese expertise. Furthermore, the study recommended that a more lasting and realistic effect of LS should be ensured by training school heads, directors of education of the Ghana Education Service, and policymakers in education, which are in line with the recommendations of this present study.

This section has explored the perceptions of teachers and principals regarding the use of LS in developing the CK of primary school Math, Science, and Arabic teachers. As evident from the above discussion, both the quantitative and qualitative components of this research showed a positive perception of the research participants on the influence of LS on the CK of teachers. This is also confirmed by the existing literature across different countries.

8.5 The influence of LS on building school-based collaborative learning communities

LS has grown in popularity over the past two decades as a model of teacher collaboration and as a form of PD for teachers in a wide variety of educational contexts globally (Huang and Shimizu, 2016; Leavy and Hourigan, 2016). In terms of value, evidence in the existing literature demonstrate that LS helps to improve collaboration amongst teachers (see, Lewis and Perry, 2017; Shuilleabhain, 2016) and influences teacher practice (Olsen et al., 2011). This section discusses the perceptions of teachers and school leaders regarding the impact of LS on building a collaborative learning community in Saudi Arabia based on the literature.

The results of the quantitative data revealed that most participants scored the scale items on this theme as "strongly agree". This is an indication that most of the teachers appeared to have positive perceptions toward using the LS model since it encourages teachers to work collaboratively. Qualitatively, data from the participating teachers indicated that by using LS they feel that it enhances the collaborative work culture at school, peer observation, and breaking the culture of isolation. Furthermore, the teachers expressed that their participation in the LS model has been helpful in the following aspects: collaboration with colleagues, exchange of knowledge and experience with colleagues, alleviating any sense of isolation at school, helping team members work together harmoniously, offering team members the opportunity to observe each other to improve their respective teaching practices, and the LS model enhances the collaborative work culture at school.

Teachers and school leaders also believed in the importance of the LS model in building a collaborative learning community in their schools – that is, collaboration amongst teachers in order to best promote their learning and student achievement. Notably, the teachers indicated that participation in the cycles of the LS removed the barriers to working together that hindered them to do so. This result reflects what is said in the literature, namely that the LS is a tool that brings together teachers to work together (Lawrence and Chong, 2010; Cajkler, et al., 2014).

Many teachers and school leaders also indicated that through their involvement in LS, the strategy helps them to engage in collaborative work including direct observation by

colleagues. It was also indicated that LS has been instrumental in encouraging teachers and school leaders to communicate more effectively and develop a willingness to discuss and share ideas with each other. This research outcome is in tandem with the work of Lewis (2009), Coe et al., (2010) and Murata (2011) who have all shown light on the need for meaningful engagement and communication among teachers in order to avoid isolation (Chokshi and Fernandez, 2004) have also made claim to the positive impact of the LS on the interpersonal relationships of teachers. Moreover, teachers were also observed to expand their cooperation beyond the research lessons in order to address the problems they face in their work (Villegas-Reimers, 2003).

The research findings also corroborate the work of Garet et al., (2001) and Coe et al., (2010) who observed that structures that allow teachers to work together, share ideas, observe each other, and provide feedback and support to each other are effective in improving teacher learning and bringing about reforms in classroom practices. However, there is evidence in the findings that the notion of collaborative working is new to most teachers and school leaders in Saudi Arabia, which might be due to the culture of the people (which is more of competition rather education) (Little, 1990). For instance, it seemed that to some extent the teachers did not have the skills to engage objectively with each other during the discussions. This was also evident in the way in which they questioned each other and welcomed the exchange of ideas. Generally, such evidence was particularly in schools where isolation is the norm making collaboration difficult to embrace. Another possible explanation for this result is indicated by the findings of Jhang (2020). Jhang (2020) emphasised the critical importance of collaboration in LS implementation. However, it was suggested that collaboration may represent a threat to teacher autonomy particularly when teachers are advised to change their methods of instruction or adapt their lesson. Therefore, Jhang (2020) recommended making teachers more aware of the strengths of LS to support its implementation.

Cajkler et al., (2014) noted the feasibility and value of collaborative LS as a vehicle for teacher learning development in the work while highlighting how their programme strengthened their students' understanding that collaboration helped them to develop over time and developed a stronger sense of teacher community. Similarly, Handayani et al., (2019) indicated that LS has positive impacts on teachers professionally by enhancing their

engagement in collaborative work and creating a sense of an indigenous community through which mutual trust is well established.

In summary, this section has explored the ways by which participating in LS activities helped to build collaborative learning communities in participating schools. The above discussion demonstrates that both the quantitative and qualitative components of this research present a positive perception about the significance and need for building collaborative learning communities in Saudi Arabia. This research outcome is also confirmed by the existing literature across different countries. However, there was evidence in the findings that suggested that teachers in KSA needed more training to encourage the culture of collaboration as they apparently lacked the skills needed to effectively engage in collaboration.

8.6 The perceived benefits of using LS in primary school context

Based on the data gathered, it appeared that the majority of teachers have positive perceptions toward the benefits of using LS. Most of them expressed that they get benefits from using the LS model including but not limited to an upgrade in their teaching practices which contributes to the development of a sense of collective responsibility towards student learning, providing reports that are considered a helpful resource to other teachers, helping teachers plan lessons more effectively, ensuring a deeper student understanding, contributing to the teacher being more confident while teaching and planning lessons with others is better than planning lessons individually.

Similarly, the outcomes in the qualitative research indicated that teachers supported the view that by using LS, they obtained the following benefits regarding improving teacher performance, improving student outcomes, ability to link daily teaching practices to long term objectives, and changes in motivation and a sense of effectiveness. The results in the quantitative also revealed that most participants scored the scale items in this dimension as "strongly agree" level. The three areas of focus in this thesis are: improving teacher performance, improving student outcomes and the ability to link daily teaching practices to long-term objectives, and changes in motivation and a sense of effectiveness. These findings are discussed in relation to the existing literature in detail below.

Improving teacher performance:

The findings of the present study confirmed that having positive perceptions regarding the association between implementing LS and improving teacher performance. The conclusions of Xu and Pedder's (2015) reviewed papers similarly indicated that LS is beneficial in a number of ways including but not limited to:

- Teacher development and collaboration of a professional learning community.
- Growth of professional knowledge, practice and professionalism.
- Impact on the students' learning.
- The quality of classroom instruction and learning.

In the same vein, Huang and Shimizu (2016) concluded that LS is a potentially effective approach to PD and that LS can provide teachers with a powerful tool to enhance their teaching practice. Similar to the observed benefits of LS implementation in this present study, Wright Jr (2009) noted the positive improvement in the CK of participants in areas of deeper understanding, increased self-confidence, enhanced pedagogical knowledge in areas of planning and student thinking as well as improvement in the achievement of their students.

Improving student outcomes:

Norwich and Ylonen (2013) identified that LS improves outcomes for students (ages 11-14 years) with moderate learning difficulty. The findings showed that teachers are able to adapt the LS approach to their specific subject areas and to identify student needs. In addition, Andrew (2012) reported the perceived benefits of LS in improving the performance of accounting students in drawing up cash budgets. It was found that student learning had progressively improved over the period during which the LS module was used. Lewis et al. (2009) also identified improvement in pupils learning alongside other benefits of LS in their study among teachers in North America. The findings of this study are consistent with those of Salem (2011) in Qatar who provided evidence that LS improves students' outcomes.

In Indonesia, Ramadhana and Noble (2019) indicated that LS is still an effective method that can improve the quality of learning as evidenced by the perceptions of lecturers, teachers and students. In addition, Cheung and Wong (2014) identified that there is a positive

correlation and evidence that supports the benefits of LS and Learning Study as a powerful tool that helps teachers to examine their practices and improve learning for students. Although these studies all provide evidence in support of LS, different outcome measures are employed and there are also differences in the research designs.

The above is in sharp contrast to the research findings by Murphy et al. (2017) who identified that the application of LS proved redundant in regard to student learning outcomes, and that there was no evidence that this version of LS [in England] improves maths and reading attainment. This cast some doubts on the universal applicability of LS which is similarly echoed by the findings of the present study as will be detailed later in the chapter.

LS serving as a motivation and developing a sense of effectiveness in teachers:

This finding is tandem with that of Chong and Kong (2012) who indicated that LS provided the conditions that support the effectiveness of teachers. They argued that by developing the self-efficacy of teachers, LS motivates teachers to assume greater responsibilities for pupils' learning which ultimately makes a difference to the quality of classroom practice. Along a similar line, Jalal (2014) in his study of LS in Bahrain concluded that LS as a teaching strategy had helped all parties improve their technical and teaching skills in terms of critical thinking reflections as well as growing confidence and creating positive attitudes towards the profession.

In summary, this section has explored the perceptions of teachers and principals regarding the benefits of using LS in Saudi Arabia. The three main thematic areas discussed are: *improving teacher performance, improving student outcomes, and LS serving as a motivation and developing a sense of effectiveness in teachers*. Overall, the bulk of the discussion demonstrates that, both the quantitative and qualitative components of this research present a positive perception about the benefits of using LS in Saudi Arabia. However, the largely positive outlook of this research contradicts some of the existing literature, notably, Murphy et al. (2017) and Salem (2011), both in relation to improving student outcomes.

8.7 Perceived challenges of using LS in primary school context

In Japan, teachers routinely participate in LS which is often cited as having an impact on their students' mathematics and science success (Fernandez, 2005; Stigler and Hiebert, 1999; Watanabe, 2002). However, there is also evidence to suggest that this PD endeavour, which arguably makes Japan one of the highest performing maths and science countries, experiences some challenges in its implementation in schools outside Japan (Adamson and Walker, 2011; Saito and Atencio, 2013; Ponte et al., 2018). Thus, despite the numerous benefits attributed to LS practice as evidenced by the literature, the findings of the present study confirmed that challenges such as cultural and contextual differences contribute to its unsuccessful implementation in jurisdictions outside Japan thereby raising questions about its sustainability. This section explores and discusses the perceptions of teachers and principals regarding the challenges of using LS in Saudi Arabia at two broad levels – Macro and Micro levels.

Macro level challenges:

As evidenced by the findings of this study, the majority of the teachers expressed that they are currently facing challenges in their teaching and learning from implementing the LS model. Examples of the difficulties the findings showed were having insufficient time for collaborative LS activities at school and insufficient provision of training before implementing LS. In addition, the findings indicated teachers and school leaders' lack of adequate understanding of how to implement the LS model and some showed negative attitudes towards LS. The lack of sufficient support and resources that enable high quality implementation of the LS model and lack of long-term vision for the implementation of the LS model were other examples. Further challenges the findings indicated in relation to teachers' CK and PCK when implementing LS included the lack of adequate knowledge of the scientific content of respective teacher subject specialisations upon the implementation of the LS model, lack of adequate knowledge of the teaching skills possessed by teachers upon the implementation of the LS model, inadequate emphasis upon students' educational needs and lack of sufficient school administrative structures to activate the LS model.

Fernandez (2002) explored the difficulties of introducing LS in USA which showed similar challenges including gaining time and interest for LS, fear of having others observe one's lesson, and gaps in teacher subject matter knowledge. Some of these challenges are also consistent with those described by Chokshi and Fernandez (2004), namely lack of time, lack of adequate understanding of LS and fear of opening peer observation classrooms.

LS challenges:

Challenges may arise from deep differences in educational systems and in the professional culture of teachers. For instance, in Japan, LS is a widespread practice which is carried out on a large scale with the support of educational authorities. On the other hand, as this study showed, in many other countries including Saudi Arabia it is still a marginal practice undertaken only on a small scale, and mostly on an exploratory manner (Ponte et al., 2018).

The challenge of preparation and implementation: This can be problematic in contexts outside Japan. For instance, it is claimed that the adoption of LS in a number of countries is based on misunderstandings of how it is done in Japan (Fujii, 2014). Nevertheless, it is worth noting that there are very different practices in Japan regarding LS, depending on the organisations that promote them (schools, regional, national bodies, associations) and their aim (PD of a group of teachers or demonstration by a veteran teacher).

The lack of CK on the part of teachers: This main challenge is highlighted by Ball (1990), Borko et al., (1992), Hart and Carriere (2011) and Choksi and Fernandez (2004) who all argued that it is difficult to implement LS effectively when teachers lack sufficient knowledge to do so.

Most of the challenges in this study are in line with Yoshida (2012, p.142), who reflected much of this in his study which is also based in the US. He identified several challenges when implementing LS over a 12-year period, which included:

- A misunderstanding and/or lack of understanding about LS
- Insufficient support and resources to conduct high-quality LS
- A lack of teachers' content and pedagogical knowledge
- A non-systematic approach to conducting effective LS
- Short-sighted planning; for 'improvement', purposes, and not enough time for PD

Similar to this study, Yamnitzky (2010) explored primary teachers' perspectives on the impact LS participation had on their mathematics knowledge and teaching and their perspectives on how LS involvement affected their mathematical CK and PCK. Despite reporting positive perceptions and impact on teachers' CK and PCK, time was a major challenge such as scheduling time to meet and the amount of time needed to spend on LS.

The results of Likando's (2018) study examining the implementation of LS in Zambia's secondary mathematics showed some similar challenges including low commitment by school management to teacher PD, insufficient time, school geography, negative attitudes among some teachers, inadequate teacher skills and inadequate materials.

The challenge of embeddedness: in one university in Jakarta, Indonesia, LS was embedded in a teaching practice unit (Meiliasari, 2018). The reported difficulties were time, detailed preparation and management of the school factor and classroom.

Participation as a challenge: Abdella (2015) conducted a qualitative case study that explored the effects of LS on the learning and practice of science teachers in selected Eritrea middle schools. The findings showed that LS participation is challenging due to lack of time, large class size, curriculum overload, poor living conditions for teachers, lack of resources, lack of adequate space, poor English skills for students, process novelty and negligence of students. All these reported challenges which this study showed aim to contribute to the literature which raises doubts regarding the suitability of LS in different national contexts (Ponte et al., 2018).

Lack of familiarity: In Canada, the findings of Bridges (2015) indicated several difficulties including unfamiliarity of teachers with the students being taught, time spent engaging in LS, teachers in the role of observers, and effect of observers and videotaping on students and teachers during the lessons.

Cultural change in classroom: Odindo (2019) investigated the impact of the LS method on quadratic expressions and equations teaching and learning. The findings showed that change in the culture of the classroom, duration of the lesson, and the shortage and workload of teachers were some of the challenges facing the participants.

Implementation difficulties: Chassels and Melville (2009) also conducted a study to examine the advantages and disadvantages of involving teacher candidates in LS. The research identified implementation difficulties related to time, practical placements, and associate teachers' PD.

Lack of institutional support: Ogegbo et al. (2019) showed challenges such as lack of time, lack of institutional support and inadequate educational materials pose a threat to the participation of teachers in LS.

Chiew et al. (2016) identified challenges in the context of Malaysian education. There were three limitations on a micro-level, namely time, the workload of teachers and the perception of teaching observation. The challenges identified on a macro-level included the lack of PD awareness among teachers, and the exam-oriented culture rooted in the education system. In the UK, the Teacher Development Trust (TDT, 2019) addressed the critical contextual barriers that schools may face when introducing LS in a course which supported schools to carefully think about their LS approach design, ensuring that they have access to structured support and expert input. However, the course identified the following challenges; teacher workload issues ever-shrinking budgets, and so many changes to curriculum, exam specifications and assessment. (TDT, 2019).

In summary, it has been acknowledged in this section that LS can have a positive effect on pupil learning, teacher practice and school culture. However, its application in systems outside Japan presents some real challenges and raises valid questions regarding its suitability globally. In this section some of these challenges have been discussed at two broad levels – Micro and Macro levels. Some of these challenges are compared to the literature highlighting the reality that they are by no means limited to the Saudi Context as the findings of this study indicated.

Chapter 9 Conclusion, Contribution and Recommendations

9.1 Introduction

LS as a model for PD has been embraced globally with varied amounts of success. This state of affairs is partly because different countries including the KSA have adopted different implementation strategies. However, particular countries are also challenged in different ways in their attempt to implement the LS model because of structural as well as socio-cultural differences. In the particular case of KSA a notable challenge has been the lack of relevant existing literature based on empirical research on LS within the Saudi context and other contexts with similar cultural values. This study therefore originated from the researcher's interest in contributing to this area of research through investigating different perspectives on LS implementation. As a General Supervisor of Teachers' Development within the Saudi MoE the researcher has been part of teacher development in KSA and hopes the outcome of this research will make a positive contribution to the implementation of LS in KSA.

The study explored how LS practices are utilised within primary schools in Saudi Arabia using Riyadh as a case study. It is focused on providing original evidence on the LS model for PD in Saudi Arabia. Contextually, the LS model is currently being piloted in KSA. The research findings could help in shaping the education policy locally when the strategy is rolled out and internationally in different contexts. Given that the Saudi MoE only implemented a pilot of LS in 2015, it is highly likely that this study is the first of its kind in KSA. For this reason, this study is expected to serve as a key reference for future studies regarding the Saudi experience with LS in primary schools particularly at its early stages. Furthermore, the research also highlights how certain cultural assumptions can impact on the replication of the LS model in similar contexts (see, Stigler and Hiebert, 2016). This implies that this research could contribute to the literature on LS implementation in other contexts which have similar religious, cultural and political attitudes to Saudi Arabia.

The problem underlying this study was that from 2000, the MoE (2014) in Saudi Arabia has focused on school-based PL strategies, which were designed to tailor professional learning, to meet the needs of both schools and individual teachers. In 2015, the decision was taken by the MoE to utilise LS as a method to meet those PL needs. A pilot project was implemented and, approximately 500 primary school teachers of Mathematics, Science, and Arabic Language, (in 60 schools throughout: Riyadh, Eastern Region, Hail, Taif, and Al Madinah al-Munawarah), started using LS as a method of professional teacher development (Ministry of Education, 2017). This study aims to investigate LS practices utilised within primary schools in Riyadh. This study is a descriptive case study that took place in four purposefully selected primary schools in the Riyadh region of Saudi Arabia and involved 50 teachers and four school leaders. The unit of analysis was a group of schools where LS was implemented as a PD model. The study also seeks to provide a set of practical recommendations for the mainstreaming of LS in Saudi Arabia. A summary of the main research findings is provided below.

9.2 Summary of Findings

To understand LS practices in Saudi Arabia using Riyadh as a case study, the answers to the following key research questions were explored:

1. What are primary school teachers and school leaders' perceptions of the impact of LS on developing content knowledge of Maths, Science and Arabic?
2. What are primary school teachers and school leaders' perceptions of the impact of LS on developing pedagogical content knowledge of Maths, Science and Arabic?
3. How does participation in LS influence school-based collaborative learning communities?
4. What are the perceived benefits of implementing LS in primary school context?
5. What are the perceived challenges in implementing LS in primary school context?

This section provides a summary of the key findings of this study under each specific research question.

Firstly, the study flagged the perceived impact of LS on teacher Content Knowledge (CK).

The majority of the teachers showed positive perceptions toward utilizing the LS model. Most of them expressed happiness to use the LS model to develop their CK. The results in quantitative revealed that most participants scored the scale items in this dimension as "strongly agree" level. In the quantitative dimension of this study, the teachers also expressed that their participation in the LS model has been helpful in the various aspects such as gaining sufficient knowledge of the basic concepts that students are expected to learn in their subject, ensuring a deeper understanding of the scientific content related to their fields of specialization, perceiving the scientific links between their fields of specialization and other fields, being prepared to discuss any scientific or perceptual aspects related to their fields of specialization, and ability to link the subject with the student's real life.

Similarly, the results in the qualitative dimension of this study indicated that through the use of LS, teachers perceived gaining enhanced knowledge and understanding, improved teaching-related skills, changes in the beliefs and attitudes of teachers, and building confidence in their ability to teach their subjects of specialty. Both teachers and school leaders also reported that the collaborative aspect of LS appeared to have increased their CK as they planned lessons with other teachers. Teachers in particular emphasized the significance of collaborating with their colleagues in order to best promote their learning and student achievement.

Secondly, the research highlighted the perceived impact of LS on enhancing teacher

Pedagogical Content Knowledge (PCK). For instance, the results in the quantitative aspect of the study revealed that most participants scored the scale items in this dimension as "strongly agree" level. From the qualitative dimension, the teachers expressed that their participation in the LS model has been helpful in the following aspects: sufficient knowledge of the basic concepts that students are expected to learn in the subject, ensuring a deeper understanding of the scientific content related to their fields of specialization, perceiving the scientific links between their fields of specialization and other fields, being prepared to discuss any scientific or perceptual aspects related to their fields of specialization, and ability to link the subject with the students' real life.

In addition, the results from the qualitative dimension of the study indicated the following perceived changes as a result of the implementation of LS in KSA: adaptation and reliance on the use of new and improved teaching strategies as well as methods, adoption and use of best practices through better understanding of how children learn mathematics and science effectively. Both teachers and school leaders also reported that the collaborative aspect of LS appeared to have raised their PCK as they planned lessons with other teachers. These were deemed significant in promoting student learning and achievement.

Thirdly, the research noted the perceived need for building a collaborative learning community. Most of the teachers appeared to have positive perceptions toward using the LS model, which they argued encourages them to work collaboratively. For instance, the results indicated that most participants scored the scale items in this dimension as "strongly agree" in the quantitative dimension of the research indicating a positive correlation. The following were specifically identified by teachers to be particularly helpful to their course through their participation in the LS programme: enhancement of a collaborative work culture with colleagues in schools, exchange of knowledge and experience with colleagues, minimising isolation through working together as a team, and enables team members to observe each other to improve their respective teaching practices. These factors were re-echoed throughout the qualitative findings.

Another finding highlighted is breaking the culture of isolation. This finding showed that teachers viewed LS as a helpful strategy to be more connected than ever, and as a result they perceived that LS could minimise isolation in their work. The teachers interviewed indicated that the use of LS has helped them to become more connected with other teachers who teach the same subject area – an opportunity they considered it helpful in minimising isolation within the teaching community. The participants pointed out that they are all used to working on their own during lesson preparation and teaching, which was very isolating. However, with the introduction of LS, they perceived that they are now encouraged to work collaboratively, breaking this barrier that kept them isolated.

The research findings highlighted various benefits of LS. From the data analysis chapters, it appeared that the majority of teachers showed positive perceptions towards the use of LS. The perceived benefits identified included an upgrade in their teaching practices, contributing to the development of a sense of collective responsibility towards student

learning, providing reports that are considered a helpful resource to other teachers, helping teachers plan lessons more effectively, ensuring a deeper student understanding, contributing to the teacher being more confident while teaching as well as collective planning and carrying out lessons. Other perceived benefits identified included obtaining improved teacher performance, improving student outcomes, ability to link daily teaching practices to long term objectives, as well as changes in motivation and a sense of effectiveness.

Finally, the research findings identified the perceived challenges of LS. The quantitative results revealed that most participants agreed in the scoring of the scale items under this dimension. The following perceived challenges were also identified in the qualitative data:

Sustainability: LS provides the potential for sustainable PD because it gives teachers the chance to inquire, communicate, reflect and grow professionally and, more importantly, to gain a sense of ownership among colleagues of the improvement effort (Doig and Groves, 2011). Nevertheless, the findings of this research indicated that sustainability remains a major issue to be resolved in Saudi Arabia as in many other countries outside Japan which have adopted and introduced LS model. The findings of this research showed that LS faces inevitable challenges in Saudi Arabia on an ongoing basis due to cultural and contextual factors and probably needs modifications to match local needs and context.

Some countries have identified sustainability and scaling up a challenge (Lim et al., 2011). Unlike Japan, where the teachers are internally motivated by the benefits of engaging in LS, other countries usually implement LS through a top-down approach. The government initiates it (Akiba and Wilkinson, 2016) therefore it is often not seen as a community project. Therefore, continuity or sustainability are both important features of Japanese LS but might not be given due regard across contexts (Fujii, 2014).

Time constraints: The findings indicated that the amount of time required for LS participation was reported as a significant challenge for the teachers in this study. This supports past research on the challenges of LS participation (Chokshi and Fernandez, 2004). Through the structures of a typical school day in Saudi Arabia, most teachers in primary schools have to teach five classes in a day. Therefore, schools may not have dedicated time for teachers to engage in the use of LS as a PD tool. This identified challenge needs to be factored into future planning at the policy level by the Saudi MoE.

Inadequate understanding of LS: The study has also identified certain unresolved conceptual challenges of the LS model that need to be resolved ahead of its full role out into all Saudi schools. The teachers perceived that some of the concepts in relation to LS were inherently complex, and that better understanding of them will help in its holistic implementation. It is evident in this study some of the teachers and school management showed a lack of adequate understanding of how to implement the LS model. It is evident that while general supervisors in MoE have been trained in LS through visits to Japan by JICA, the cascade model of dissemination has not been successful. An effect or consequence of this is that teachers who implemented LS lack certain basic knowledge necessary for its effective implementation.

Other challenges identified in the qualitative data are as follows:

- The scheduling of meeting times, insufficient training of teachers ahead of implementing LS, insufficient understanding of LS by some teachers.
- Lack of sufficient support and resources that enable high quality implementation of LS, teachers lack CK when implementing LS.
- Lack of long-term vision for the implementation of LS, teachers lack PCK when implementing LS, as well as negative attitudes about LS among some teachers.

9.3 Research Contribution

LS is a well-established teacher development strategy in the Japanese education system (Yoshida, 2012; Fujii, 2014) as well as in other Western contexts (Shuilleabhain, 2015a). Yet, research and policy development regarding LS is still not well established in the Saudi context, except a notable few (Al Khalif, 2016). This study therefore contributes to the growing field of study not only within the Saudi context, but also internationally in different context through providing different perspectives on LS implementation. Furthermore, it is noticeable within the existing literature that the emphasis is on explaining LS, rather than discussing its effect on the learning and practice of teachers in the classroom based on the views of teachers themselves. This research is important in this sense because it contributes to this limited body of knowledge by investigating the impact of LS on the learning and practice of teachers in classrooms. The findings of this study particularly highlight the lived experiences and perceptions of the research participants regarding how LS has impacted on their teaching and learning within the Saudi context. This could be used for capacity building, and to positively impact on student achievement. The findings provide new

understanding of the role of LS in developing different forms of knowledge for teaching discussed below.

9.3.1 Perceived Enhancement of the Content Knowledge and Pedagogical Content Knowledge of Teachers

It is suggested in the literature that PD is lasting in nature and its efficacy is meaningful in enhancing the CK and PCK of teachers (Elmore and Burney, 2000; Guskey and Sparks, 2002; Dudley, 2014). In this study, the teachers and school leaders had a similar perception of LS as a PD tool in their context. In terms of CK, the analysed data identified four related sub-themes including: (a) perceived enhanced knowledge and understanding; (b) perceived improved teaching-related skills; (c) perceived changes in the beliefs and attitudes of teachers; and (d) perceived building of confidence in the ability of teachers to teach their subjects of speciality. Overall, the findings suggested that the teachers perceived that they demonstrated increased knowledge within each of these component areas in relation to subject CK.

Specific to PCK, this case study appeared to show substantial growth in teachers' PCK for teaching although it is limited in scope. The following dimensions were identified as perceived areas in which the PCK of participants were extended: perceived increased knowledge about the use of best practices, perceived better understanding of how children learn mathematics and science, perceived increase in ability to make learning mathematics and science active and fun, perceived changes in the use of teaching-learning strategies as well as changes in teaching methods (using new learning ways of teaching and learning) as well as perceived improved strategies of learning about student difficulties. Furthermore, it was suggested that the LS model appeared to have raised the teachers' expectations for their students, suggesting that this adapted LS appeared to have addressed the challenge of teachers' underestimation of children's mathematical abilities identified in the literature review (see for instance, Sinclair and Bruce, 2015).

9.3.2 Perceived Breakdown of the Culture of Isolation

The research findings suggested that LS as a model of collaboration in PD contributes to breaking down what is referred to as culture of isolation experienced by Saudi teachers. For instance, the majority of teachers and school leaders indicated that they plan to continue with the use of LS as a PD tool primarily because of the opportunities it offers them to work with other colleagues. This is a likely demonstration that these teachers are willing to move away from the more traditional forms of PD typically offered to Saudi teachers and embrace a new paradigm— effective PD in the form of LS. It was further suggested that efficient teacher learning provides appropriate mechanisms for teachers to work together. The claim that LS is a tool for minimizing isolation for teachers and school leaders in this study means there is the perception out there - that is, classroom practices have been organised to help teachers to work in groups. Any opportunities for teachers to work together, speak to each other, share ideas and support each other is a welcome gesture. Therefore, the contribution of this study is offering new understanding about the role of LS in supporting the transition from individualistic to more collaborative forms of PD.

9.3.3 Building Professional Learning Community

In this study, teachers and school leaders stated that teachers were professional learners. This made it possible for them to become powerful intellectual resources. The findings showed that the teachers need to build trust among themselves, learn from each other, and help each other overcome barriers. As they become confident, they begin to share ideas easily without the fear of being criticised by outsiders, who are not part of their professional learning community. This has been acknowledged in previous studies about learning communities (Yoshida, 1999; Chicago Lesson Study Group, 2010; Lewis et al., 2009).

9.3.4 LS Encourages Collaboration

The participants appeared to value the extensive discussions, planning, and practice involved in the processes of LS. They identified that collaboration amongst teachers was necessary in order to enhance their CK and PCK. They referred to this as, ‘collective dialogue’, and noted that such practice has been an eye-opener to them. Teachers in particular perceived that prior to participating in the LS project, their teaching was more teacher-centred. However, they

perceived a shift to a more student-centred learning method which allows for student participation rather than see them as passive recipients of knowledge. This is in line with the existing literature (Attard, 2010; Guskey, 2000; Hargreaves and Fullan, 2012). This active learning was obvious and valued as teachers observed the lessons and then collaborated on the steps to enhance the lesson. The teachers perceived growth in their understanding of effective teaching through interaction with and building on the insights of others.

9.3.5 Teacher Observation

The findings of this study showed that teachers perceived that LS provided them with the opportunity to observe each other's practices and discuss them collectively. Student performance is most directly affected by the quality of the teaching in the classroom. (Hattie, 2011; Dinham et al., 2011). Therefore, it is important that reform initiatives in schools concentrate on successful and teacher learning PD (Darling-Hammond, 2010).

PD like LS puts learning in the classroom while teachers work in the educational community to examine teaching and learning responses during the lesson. Teachers in this study appreciated that LS provided opportunities in the classroom to view teachings and learning. Teachers were able to establish a shared understanding of what good teaching meant by looking at real classroom practice. Second, as they observed their reactions to their planned lesson, LS kept students at the centre of the teacher observations. Others may argue that the most appropriate place to do so is in a classroom lesson to strengthen teaching (Stigler and Hiebert, 1999).

The teacher learning in the classroom through the use of LS has allowed teachers to learn with their colleagues in an environment in which they already felt comfortable. When they observed their colleagues at work, they discussed how to improve their own instruction on literacy to make it more efficient. However, the findings showed that there were issues with other teachers being observed by teachers. The teachers who taught the lessons were exposed in front of their colleagues and may not have taught the way they usually teach in the classroom. The lesson being pre-planned by many adults may also have prompted the instructor to follow the scripted lesson unnecessarily in order to please the team. This is not the rule over a normal day as teachers often change lessons sporadically as they think on their feet.

While the teachers and school leaders in this study reported positive gains in their perceptions, and also reported that they plan to continue, current research suggests that these findings are very unique because teachers' PD in Saudi Arabia is not sustained nor coherent (Alharbi, 2011). It is designed nationally and delivered through Local Educational Authorities (LEAs) with an absence of the voice of "others" which can be described as one-size-fits-all (Alharbi, 2011).

All in all, this research adds to the literature on the implementation of LS in countries outside Japan by investigating perspectives on LS implementation in Saudi Arabia. Particularly, there is a limited understanding of how LS is defined by the education policy and how insufficient support for teachers results in them being unaware of the critical characteristics of LS. A deeper understanding of how its adapters, like Saudis Arabia, define LS might enable us to speculate how critical features of the LS are valued by those implementing LS outside the Japanese context.

9.4 Research Recommendations

Based on the findings, this study provides the following recommendations for policy and practice. In terms of policy, the findings of this study have highlighted several factors that have hampered the successful implementation of LS in Saudi Arabia, thereby having policy implications. Specifically, there seems to be limited understanding of how LS is defined in the Saudi education policy and how insufficient levels of support for teachers results in them being unaware of the critical features of LS. For instance, the study findings suggested that although the Saudi MoE has supported LS in the district and school levels, this support may not be active because of the many challenges in the policy. Based on the above, it is recommended that:

- The Saudi MoE should pay attention to addressing the challenges the LS model is facing such as lack of time by teachers to implement LS. For example, the Saudi MoE can improve staffing levels so that teachers' workloads are reduced thereby creating more time for LS. This could work well in schools. Another option could be to decrease the amount of content in the syllabus to create enough time for LS, moving towards a more Japanese style frugal curriculum that supports the successful implementation of LS (Lewis and Tsuchida, 1998).

- It is also evident in this study that while some general supervisors have been trained in LS through visits to Japan through JICA, the cascade model of dissemination has not been successful in extending understanding of the LS model among Saudi teachers. The effect or consequence of this is that the general supervisors have become monitors rather than supporters of LS. The Saudi MoE should therefore consider reviewing the kind of support that is provided by general supervisors over time.
- Furthermore, the suggestion by some scholars (for example, Takahashi, 2014) that practising teachers themselves could perform the role of knowledgeable other requires a long-term commitment and exposure to LS, which seems to offer few short-term opportunities for Saudi Arabia because of the current challenges in its system. For example, it takes time to learn how to develop and support worthwhile lesson plans. The MoE should consider what kind of implementation in Saudi Arabia could support the development of such.
- The researcher noted in this study that some Saudi teachers lack some of the critical features of LS – such as participation of an external expert and the investigation of a wide range of instructional materials – as highlighted in the literature (e.g., Doig and Groves, 2011; Fujii, 2014; Takahashi, 2009). There is therefore the need for policymakers to ensure that LS teams are aware of, and implement, the features that make LS most effective.
- In addition, since sustainability remains a major issue in PD in Saudi Arabia, associated challenges including cultural and contextual factors needs modifications from policymakers under the MoE to match local needs and context.
- Policy makers could also put forward a comprehensive and long-term vision for the implementation of LS in the KSA since some teachers in this study stated that they had lacked a long-term vision for the implementation of LS. This will help teachers to understand clearly the long-term objective of using the LS model as a tool for PD.
- Policymakers should also design and implement awareness promoting programmes that will encourage and serve as incentives for teachers. This will help to deal with current negative perceptions and attitudes that exist in some teachers about using the LS model as a tool for school-based PD model.

This study contributes to the literature on the implementation of LS in countries other than Japan. Given that Saudi Arabia is different from Japan in terms of geopolitical as well as socio-cultural terms, the findings of this study will help support the implementation of LS in cultures similar to that of the KSA. The findings also provide new understanding on the role of LS in developing different forms of knowledge for teaching and supporting the transition from individualistic to more collaborative forms of PD.

In terms of practice, the following are recommended based on the findings of this research:

- Based on the outcomes of this research, it is suggested that the Saudi government should increase the budgetary allocation including the provision of adequate instructional materials to all schools ahead of the extension of LS as a PD tool to other schools. These would help improve the effective implementation of LS in Saudi schools.
- Expanding the implementation of LS in Saudi Arabia as a viable and effective strategy to bring teachers together to collaborate and to jointly seek solutions to their pedagogical problems. This will provide a viable and quality window of opportunity for teachers to engage in PD, which is central to improving the quality of education delivered to students.
- Teachers should be allowed the needed time to participate in PD programmes, as well as opportunities to practice in the classroom. The leadership in schools can support this call by initiating an allocated time on the school timetable for teachers to enable them to engage in such PD schemes.
- Teachers should be given incentives to keep them motivated in order to commit themselves to implement what they learn from PD initiatives.
- There should be mechanism in place by the Saudi MoE to regularly evaluate the effectiveness of the LS model as a PD model.
- There should also be a research and development unit to carry out research on the usefulness of LS to the Saudi education system in general.
- There is also the need to examine the cost-effectiveness of implementing the LS model in Saudi Arabia relative to other alternative models.

9.5 Limitations of the Study

Perhaps the success of this study is best seen within the context of its limitations. Indeed, there were a number of limitations that were identified during the conduct of this study; broadly grouped into methodological and theoretical limitations. While some of the identified limitations are inherent to case study, others are peculiar to this study. This section highlights the main limitations identifiable with this study.

- *Methodological limitations:* This study is mixed method research based on case study as a research methodology. Section 5.3 provides the justification for choosing case study from a myriad of methodologies, for instance, offering the researcher the opportunity to study the phenomenon within its real-world context (Yin, 2018). However, the use of a case study makes the data generated unique to the cases studied and difficult to generalise. This might be seen as a limitation of the study, although the intention with this study was not to generalise the findings to a larger population but to understand the diversity of views regarding teachers working in the Saudi context – for instance, males versus females. The rationale was also to gain different views of teachers who work in various settings.

Another methodological limitation is that different means were used to interview the research participants (face-to-face interviews for male participants and phone interviews for female participants). Although such differences might have resulted in some difficulties such as the inability of the researcher to observe the body language of female participants, the rationale for conducting interviews with female participants by phone was that it was going to be impossible for the researcher to have access to female participants face-to-face. The socio-cultural norms of Saudi Arabia do not allow for two adults who are not blood related or husband and wife to be in such close proximity as to allow for interviewing for academic purposes. Therefore, although the phone interviews limited my ability to examine the participants' cues in terms of body language and facial expressions; I found the phone interviews to be an effective data collection method.

- *Subjectivity:* the subjectivity of the coding process and content analysis used in this study could be seen as a limitation. It is possible that other researchers could have relied on other coding strategies for the same data that might have altered the research findings. However, the researcher is resolved that the coding process adopted was best suited and helped in

answering the research question. The decision to use the particular coding process was taken in consultation with the supervisors who were also convinced that it was ideal for the study.

- *Theoretically*, this study is also limited in the following ways. While current research suggests that there may be a link between teachers' perceptions of their skills and readiness to teach and resulting actions in their classrooms (Smith et al., 2015), this study was not conducted in classrooms and does not claim to report any changes in actual behaviour or in student achievement. Unlike other contexts, LS is still in a pilot phase in the KSA. Therefore, it was not possible to examine the impact of LS in the classroom or evaluate its effectiveness.

Additionally, this study could be considered limited to the extent that it did not use the achievement of students in exploring how LS affect teachers' CK, PCK, and building collaboration among them with the ultimate goal of enhancing student learning (Yoshida, 2012). Because LS in Saudi Arabia is still in the piloting phase, it was not possible to examine its effectiveness on student learning.

Finally, given that the Saudi MoE only implemented a pilot of LS in 2015, it is highly likely that this study is the first of its kind in Saudi Arabia. Therefore, it was increasingly difficult to find studies that neatly fitted into the Saudi context. The literature on LS in Saudi Arabia is limited, thereby narrowing the scope in understanding the phenomenon beyond what is known.

9.6 Reflections and Further Research

As a result of this research, I offer recommendations for further study. As many district and school administrators look for ways to improve teaching and learning, educational leaders must find ways to motivate reluctant teachers who refuse to collegially participate in collaboration practices with colleagues. Further study is needed on districts and schools who have implemented a successful systemic implementation of LS in Saudi Arabia. How did they do this, and to what extent is it effective? Further studies could engage in research around the PL culture at a school site that would be conducive to an innovative practice such as LS. Recognizing that teachers are adult learners who are agents of their growth, effective school leaders understand that "learning is an experience driven largely by the learner" (Calvert, 2016, p. 4). In order to build the instructional capacity of teachers and advance the

work to increase student achievement, school leaders must implement an effective PL system connected to teacher practice, aligned to district and state instructional priorities, and structured to enable teachers to collaborate. This study supported the conclusion that LS can be one such effective PL system. By sharing their expertise with one another and using their own student data to drive instructional decisions, teachers can develop the agency to increase student achievement.

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Appendices

Appendix 1 The structure of interview (English)



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Semi-Structured interview will be conducted for the participants and the interviews will be guided by the following themes:

1. The importance of Lesson Study (LS) for Professional Development.
2. The effect of LS in teachers' content knowledge / Pedagogical knowledge.
3. The benefits of LS for teachers.
4. The challenges of LS for teachers.
5. The impact of LS on teachers' collaboration.



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ستكون المقابلة شبه مفتوحة ، وستكون موضوعات المقابلة المقترحة :

1. أهمية استراتيجية دراسة الدرس بالنسبة للتطوير المهني.
2. التأثيرات التي قامت بها استراتيجية دراسة الدرس على المحتوى المعرفي للتخصص و المعرفة التربوية لدى المعلمين.
3. الفوائد التي حصل عليها المعلمون عند استخدام استراتيجية دراسة الدرس.
4. التحديات التي يواجهها المعلمون عند استخدام استراتيجية دراسة الدرس.
5. تأثير أنشطة استراتيجية دراسة الدرس على قدرة المعلمين على التعاون فيما بينهم.

Appendix 3 The structure of the questionnaire (English)

Dear Participant

College of Social Sciences Research Ethics Committee

Lesson Study as a model for teacher development

Case Study of a number of a number of Primary Schools in various regions of the Kingdom of Saudi Arabia

I extend my thanks to you in advance for taking part in this questionnaire. I'm a General Supervisor of professional development at the National Center for Teacher Professional Development, currently delegated on a scholarship at the University of Glasgow in the United Kingdom to prepare a doctoral dissertation on Teacher Development. I'm conducting a research aiming to explore the points of view of teachers, applying the lesson study model, regarding this model being the approach of choice for teacher professional development and to identify the impact of this model upon teachers who apply it in terms of the following aspects:

The scientific content of the subject of specialization-Teaching Skills-Collaborative work culture-Positive Aspects-Challenges.

The expected duration for completion of this questionnaire isn't more than seven minutes. It is to be noted that your participation is entirely voluntary and that you are entitled to refuse to participate at any time even after you have commenced to complete the questionnaire. Your kind cooperation is essential for the success of this study.

I'd also like to inform you that all data and answers that are included herein shall only be used for the purpose of this research objective and shall remain absolutely confidential and that no reference whatsoever shall be made to your personal information in the results of the study. Completion and Delivery of this questionnaire means your advance agreement to the use of the data to fulfil the requirements of this study.

If you have any inquiry related to this study or to your participation herein, please feel free to contact this researcher through the following E-mail:

m.almadi.1@research.gla.ac.uk

or by phone No.

Regards

Maged Saad Almadi

General Supervisor of professional development,

National Center for Teacher Professional Development,

Currently delegated on a scholarship to prepare a doctoral dissertation on Teacher Development,

University of Glasgow in the United Kingdom

Lesson Study as a model for teacher development

Case Study of a number of a number of Primary Schools in various regions of the Kingdom of Saudi Arabia

First: Primary Data

1-Gender	Male	Female
2-Age	Less than 30	30-40
3-Teaching Experience (No. of years)	1-5	6-15

4-Subject Specialization	Mathematics	Science
5-Educational Level	Post -GCSE Diploma	Bachelor's Degree
6- Experience in terms of lesson study participation (No. of years)	1	2

Second: Questionnaire Statements

Statement	Strongly approve	Approve	Indifferent	Strongly disapprove	Disapprove
1 Collaboration with Colleagues					
2 Using Active Learning Strategies in Teaching					
3 Employing Technology in Teaching					

4	Providing Students with various learning methods					
5	Using various and multiple formats for evaluation					
6	Using Alternative Teaching Strategies for students with learning disabilities					
7	Understanding how students learn the subject I'm teaching					
8	Exchange of knowledge and experience with colleagues					
9	Sufficient knowledge of the basic concepts that students are expected to learn in the subject I'm teaching					
10	Ensuring a deeper understanding of the scientific content related to my field of specialization					

11	Perceiving the scientific links between my field of specialization and other fields					
12	Being prepared for discussing any scientific or perceptual aspects related to my field of specialization					
13	Ability to link the subject with the student's real life					
14	Upgrading my teaching practices					
15	Alleviating my sense of isolation at school					
16	The lesson study model helps team members work together					
17	The lesson study model contributes to the development of a sense of collective					

	responsibility towards student learning					
18	The lesson study model reports provide a helpful resource to other teachers					
19	The lesson study model enables team members to observe each other to improve their respective teaching practices					
20	The lesson study model helps teachers plan lessons more effectively					
21	The lesson study model ensures a deeper student understanding					
22	The lesson study model contributes to the teacher being more confident while teaching					
23	Planning lessons with others is better than planning lessons individually					

24	The lesson study model enhances the collaborative work culture at school					
25	Insufficient time for collaborative lesson study activities at school					
26	Lack of adequate understanding by school management of how to implement the lesson study model					
27	Lack of adequate understanding by teachers of how to implement the lesson study model					
28	Lack of sufficient support and resources that enable high quality implementation of the lesson study model					
29	Lack of long term vision for the implementation of the lesson study model					

30	Lack of adequate knowledge of the scientific content of respective teacher subject specializations upon the implementation of the lesson study model					
31	Lack of adequate knowledge of the teaching skills possessed by teachers upon the implementation of the lesson study model					
32	Inadequate emphasis upon students' educational needs					
33	Lack of sufficient school administrative structures to activate the lesson study model					

Appendix 4 The structure of the questionnaire (Arabic)



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عزيزي المشارك / عزيزتي المشاركة

أقدم لكم بالشكر سلفاً لمشاركتكم في هذا الإستبيان . أنا مشرف عام التطوير المهني بالمركز الوطني للتطوير المهني التعليمي بوزارة التعليم ، مبتعث حالياً لدراسة الدكتوراه في تطوير المعلمين بجامعة جلاسكو بالمملكة المتحدة. أقوم بتطبيق بحث يهدف إلى استكشاف وجهات نظر المعلمين /المعلمات المنفذين ل نموذج بحث درس ك منهج للتطوير المهني للمعلمين /المعلمات ، و التحقق من تأثير هذه النموذج على المعلمين/المعلمات المنفذين من النواحي التالية:

المحتوى العلمي للتخصص ، المهارات التدريسية ، ثقافة العمل التعاوني ، الإيجابيات ، التحديات .

المدة المتوقعة لتعبئة الاستبيان لا تتجاوز سبع دقائق . علماً أن المشاركة تطوعية ويحق لك رفض المشاركة في أي وقت حتى بعد البدء في تعبئة الإستبانة. تعاونكم في تعبئة الإستبيان مهم جداً لنجاح هذه الدراسة.

كما أود أن أحيطكم علماً بأن البيانات والإجابات سيتم استخدامها فقط لغرض أهداف البحث و ستبقى سرية ولن يتم الإشارة إلى أي معلومات شخصية لكم في نتائج الدراسة، و الانتهاء من تعبئة الاستبيان و تسليمه يعني موافقتكم المسبقة لاستخدام البيانات لمتطلبات الدراسة.

في حال وجود أي استفسار يتعلق بالدراسة أو مشاركتكم، يرجى التواصل مع الباحث على البريد الإلكتروني التالي:

m.almadi.1@research.gla.ac.uk

أو التواصل على الرقم: 0505447362

هذا وتقبلوا فائق التحية والتقدير ،،،

ماجد بن سعد الماضي

مشرف عام التطوير المهني بالمركز الوطني للتطوير المهني التعليمي بوزارة التعليم

مبتعث لدراسة الدكتوراه في تطوير المعلمين

جامعة جلاسكو

بحث الدرس كنموذج للتطوير المهني للمعلم:

دراسة حالة لبعض المدارس الابتدائية في بعض المناطق في المملكة العربية السعودية

أولاً- البيانات الأولية:

1.النوع	<input type="radio"/> ذكر	<input type="radio"/> أنثى
---------	---------------------------	----------------------------

2.العمر	<input type="radio"/> أقل من سن 30	<input type="radio"/> 30-40	<input type="radio"/> 41+
---------	------------------------------------	-----------------------------	---------------------------

3.الخبرة في التدريس (عدد السنوات)

<input type="radio"/> 5-1	<input type="radio"/> 6-15	<input type="radio"/> 16+
---------------------------	----------------------------	---------------------------

4. التخصص الذي تدرسه

<input type="radio"/> الرياضيات	<input type="radio"/> العلوم	<input type="radio"/> اللغة العربية
<input type="radio"/> غير ذلك (يرجى التحديد)		

5. المستوى التعليمي

<input type="radio"/> دبلوم بعد شهادة الثانوية العامة
<input type="radio"/> البكالوريوس
<input type="radio"/> الماجستير
<input type="radio"/> الدكتوراه
<input type="radio"/> غير ذلك (يرجى التحديد)

6. الخبرة في المشاركة في نموذج بحث الدرس (عدد السنوات)

<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
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ثانياً- عبارات الاستبانة

العبرة	أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
أ- ساعدتني المشاركة في نموذج بحث الدرس على:					
1. التعاون مع الزملاء.					
2. استخدام استراتيجيات التعلم النشط في التدريس.					
3. توظيف التكنولوجيا في التدريس.					

					4. تزويد الطلاب بطرق مختلفة للتعلم.
					5. استخدام أشكال مختلفة ومتعددة في التقييم.
					6. استخدام استراتيجيات تدريس بديلة للطلاب الذين يعانون صعوبات في التعلم.
					7. فهم كيفية تعلم الطلاب في المادة التي أدرسها.
					8. تبادل المعارف والخبرات مع الزملاء.
					9. المعرفة الكافية بالمفاهيم الأساسية التي يتوقع من الطلاب تعلمها في المادة التي أدرسها.
					10. تعميق الفهم للمحتوى العلمي المرتبط بمجال تخصصي.
					11. الإدراك للروابط العلمية بين مجال تخصصي و المجالات الأخرى
					12. الاستعداد لمناقشة أي جوانب علمية ومعرفية تتعلق بمجال تخصصي.
					13. القدرة على ربط المادة الدراسية بواقع وحياة الطالب.
					14. تحسين مستوى ممارساتي التدريسية.
					15. التخفيف من شعوري بالعزلة داخل المدرسة.

لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة	العبارة
ب- من خلال مشاركتي في تطبيق نموذج بحث الدرس أرى التالي:					
					16. يساعد نموذج بحث الدرس أعضاء الفريق على العمل معًا.
					17. يسهم نموذج بحث الدرس في تنمية الشعور بالمسئولية الجماعية تجاه تعلم التلاميذ.
					18. توفر تقارير نموذج بحث الدرس مصدرًا يستفيد منه المعلمون الآخرون.
					19. يمكن نموذج بحث الدرس أعضاء الفريق من ملاحظة بعضهم البعض لتحسين ممارساتهم التدريسية.
					20. يساعد نموذج بحث الدرس المعلمين في تخطيط الدروس بشكل أكثر فاعلية.
					21. يؤثر نموذج بحث الدرس على تعميق فهم الطلاب
					22. يسهم نموذج بحث الدرس في شعور المعلم بثقة أكبر في التدريس.
					23. أن التخطيط للدروس مع الآخرين أفضل من التخطيط بمفردي.
					24. يعزز نموذج بحث الدرس ثقافة العمل التعاوني داخل المدرسة.

لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة	العبارة
ج- من التحديات التي تواجه تنفيذ نموذج بحث الدرس:					
					25. عدم توفر الوقت الكافي للعمل التعاوني في أنشطة بحث الدرس داخل المدرسة.
					26. عدم وجود الفهم الكافي لكيفية تنفيذ نموذج بحث الدرس لدى إدارة المدرسة.
					27. عدم وجود الفهم الكافي لكيفية تنفيذ نموذج بحث الدرس لدى المعلمين.
					28. عدم توفر الدعم والموارد التي تمكن من إجراء نموذج بحث الدرس بجودة عالية.
					29. عدم وجود رؤية بعيدة المدى لتطبيق بحث الدرس.
					30. عدم توفر المعرفة الكافية بالمحتوى العلمي للتخصص لدى المعلمين عند تطبيق بحث الدرس.
					31. عدم توفر المعرفة الكافية بالمهارات التدريسية لدى المعلمين عند تطبيق بحث الدرس.
					32. عدم وجود القدر الكافي من التركيز على حاجات الطلاب التعليمية .

					عدم توفر مايكفي من تنظيمات إدارية مدرسية لتفعيل بحث الدرس.	33.
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Appendix 5 Plain language statement (English)



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Plain Language Statement

Study title and Researcher Details

My name is Maged Saad O. Almadi. I am a student at the University of Glasgow. For my doctoral studies I am carrying out a research project. The title of the project is:

Lesson Study as Teacher Development Strategy: A Case Study of Primary Schools in Riyadh/ Saudi Arabia.

This research is supervised by Prof Margery McMahon at the University of Glasgow (Margery.McMahon@glasgow.ac.uk, telephone:) and Dr David Morrison-Love of the University of Glasgow (email: David.Morrison-Love@glasgow.ac.uk, telephone:).

Thank you for taking the time to read this.

Invitation

I would like to invite you to take part in this research study. Before you decide whether you would like to take a part it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with me if you wish. Please feel free to ask questions about anything about which you are unclear. If you would like to have more information, please contact me. Please take your time to consider whether you wish to take part.

The purpose of the study

The aim of this study is to conduct a case study, investigating LS practices, utilised within primary schools in Riyadh, with the intention to create a set of practical recommendations for the Minister of Education in Saudi Arabia.

What is required of you.

I would like to invite you to an interview that will take up to 45 minutes, and make a recording of the interview. This will take place by arrangement with you. The interview will be conducted by skype or phone at a mutually convenient time. The data from this interview may be used in my doctoral thesis, and also any publications arising from it. You may request a copy of these documents from myself when the research is completed.

How participant's personal details will be kept confidential

The data will be gathered by codes or letters rather than the names of participants, and once the data has achieved its purpose, it will be destroyed. Access to computer files to be available by password only and, after analysis, the data will be destroyed in the presence of the researcher and the supervisors.

Please note that assurances on confidentiality will be strictly adhered to unless evidence of wrongdoing or potential harm is uncovered. In such cases the University may be obliged to contact relevant statutory bodies/agencies.

Organisation funding the research

Ministry of Education in Saudi Arabia

This project has been considered and approved by the College of Social Sciences/School of Education Research Ethics Committee at the University of Glasgow, UK

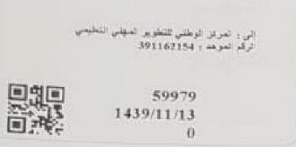
Contact for Further Information

For further information, please contact Prof Margery McMahon at the University of Glasgow (Margery.McMahon@glasgow.ac.uk, telephone:) and Dr David Morrison-Love of the University of Glasgow (email: David.Morrison-Love@glasgow.ac.uk, telephone:).

If you have any concerns regarding the conduct of this research project you can contact the College of Social Sciences Ethics Officer, Dr Muir Houston, email:

Muir.Houston@glasgow.ac.uk

Appendix 6 Acceptance letter to conduct research from Ministry of Education in Saudi Arabia (Arabic)



المملكة العربية السعودية
المركز الوطني للتطوير المهني التعليمي
(٢٨٠)

المكرم الأستاذ ماجد بن سعد بن عمر الماضي حفظه الله
(هوية وطنية ١٠٤٩٥٧٨٦٢٦)

السلام عليكم ورحمة الله وبركاته وبعد

إشارة إلى الاستدعاء المقدم من قبلكم بطلب الموافقة على تطبيق
دراستك لمرحلة الدكتوراه وعنوانها: (دراسة الدرس كاستراتيجية
لتطوير المعلم: دراسة حالة لمدارس ابتدائية في منطقة الرياض في
المملكة العربية السعودية) في أربع مدارس ابتدائية مختارة، (يتم
تحديدها لاحقاً)، من ضمن المدارس الابتدائية المنفذة حالياً لبرنامج
"بحث الدرس".

وحيث يشرف المركز الوطني للتطوير المهني التعليمي على
تنفيذ برنامج "بحث الدرس" كنموذج من نماذج التطوير المهني، لذا
نرى أنه لا مانع لدينا من تسهيل مهمتك البحثية والسماح لك
بتطبيق الدراسة وإفادة المركز بنتائجها.

وتقبلوا تحياتي،،،

المشرف العام على
المركز الوطني للتطوير المهني التعليمي

د. محمد بن سعود المقبل

Title of Project

Lesson Study as Teacher Development Strategy: A Case Study of Primary Schools in Riyadh/ Saudi Arabia.

Name of Researcher: Maged Almadi

Consent Form/ Questionnaire

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.
- 2.
3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
4. I hereby consent to participate in questionnaire.
5. I agree / do not agree (delete as applicable) to take part in the above study (Questionnaire).

Confidentiality/anonymity

I acknowledge that all participants will be referred to by pseudonym.

Data usage and storage

- The material will be treated as confidential and kept in secure storage at all times.
- The material will be destroyed once the project is complete.
- I agree to waive my copyright to any data collected as part of this project.

CONSENT

I agree to take part in this research study (Questionnaire)

I do not agree to take part in this research study (Questionnaire)

Name of ParticipantSignature

Date

Name of ResearcherSignature

Date

End of consent form

.....

Appendix 8 Participation consent form – Interview (English)



University
of Glasgow

College of Social
Sciences

Title of Project

Lesson Study as Teacher Development Strategy: A Case Study of Primary Schools in Riyadh/ Saudi Arabia.

Name of Researcher: Maged Almadi

Consent Form/ Interview

I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

I hereby consent to the interview being audio-taped.

I agree / do not agree (delete as applicable) to take part in the above study (Interview).

Confidentiality/anonymity

I acknowledge that all participants will be referred to by pseudonym.

Data usage and storage

- The material will be treated as confidential and kept in secure storage at all times.
- The material will be destroyed once the project is complete.
- I agree to waive my copyright to any data collected as part of this project.

CONSENT

I agree to take part in this research study (Interview)

I do not agree to take part in this research study (Interview)

Name of ParticipantSignature
.....

Date

Name of ResearcherSignature

Date

End of consent form

.....

College of Social
Sciences

Staff and Postgraduate Research Application Form
College Ethics Committee for Non-Clinical Research Involving Human Subjects

Before completing this form, you should refer to the guidance notes available at:

<https://www.gla.ac.uk/colleges/socialsciences/students/ethics/forms/staffandpostgraduateresearchstudents/#d.en.473063>

And

<https://www.gla.ac.uk/colleges/socialsciences/students/ethics/informationforapplicants/>

This application form should be typed and submitted electronically along with supporting documents via the Research Ethics System: <https://frontdoor.spa.gla.ac.uk/login/>

Applications should be submitted **at least 6 weeks in advance** of the intended start date for data collection to allow time for review and completion of any amendments that may be required.

Please note that applications that require PVG Clearance or permissions to access participants will not be approved until the applicant can provide evidence of this.

1 Applicant Details

Staff Research Project	<input type="checkbox"/>
Postgraduate Research Project	<input checked="" type="checkbox"/>
Project Title: Lesson Study as Teacher Development Strategy: A Case Study of Primary Schools in Riyadh/ Saudi Arabia	
Name of Applicant Maged Saad O Almadi	
School/Subject/Cluster/RKT Group College of Social Sciences / School of Education	
Student ID/Staff Number 2126111	
Programme Title (PGR Applications only) PhD Educational Studies	

2 Ethical Risks

This section **must** be completed and signed (in some form) by the appropriate parties, commenting on the research ethics risks involved in this project. **The application will be returned if this section is not fully completed.**

PGR Applications – Supervisors must complete and sign this section, approving submission for ethical review.

Staff Applications – Applicant must complete and sign this section, confirming submission for ethical review.

It should be clear from the comments provided that the potential risks have been considered and information provided on what they are, with evidence of what is to be implemented to mitigate these. You are advised to refer to the Risk Guidance

Staff & PGR: May 2018: V3

Impact of LS on teachers' Content Knowledge

Participants explained how LS offered them opportunities to develop their content knowledge

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
1	thoughts about the teaching process	... my participation in LS has given me different ways of thinking about the teaching process...T6		
2	greater knowledge and more understanding	These meetings lead to acquisition of more experience, a greater understanding of the content of the subject, exchange of knowledge and experiences among members of the study team, which in turn is reflected upon a better teacher performance in class and a good knowledge content that is reflected in enhanced student level of learning. T8	Enhanced knowledge and understanding Evidence suggesting influence of LS on teachers' subject content knowledge and understanding	Impact of LS on teachers' Content Knowledge. Participants explained how LS offered them opportunities to develop their content knowledge

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
3	opportunity for discussion and review	Peer coaching and experience exchange are beneficial to all as the discussion of lesson content and review of all ideas help us determine the best and soundest method of presenting the information to the student in a correct, easy and creative manner. (A colleague gave us the name of a book in grammar that he thinks is helpful to a freshly appointed school teacher, so we all ordered it for its significant impact upon our teaching performance). T11		
4	acquisition of adequate knowledge	LS helps us to acquire adequate knowledge of the basic concepts that students are expected to learn from the subject being taught. T2		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
5	interrelationship between subjects	It is helpful in getting us to realize the academic links between our subjects of specialization, and other subjects. T7		
6	deeper understanding of subjects	Participation in LS helps to acquire a deeper understanding of content knowledge and the various methods of understanding the subject matter.T9		
7	identifying gaps in student learning	The LS further enabled me to determine which lessons constitute a gap in students' learning. T4		
8	increased passion in teaching	The greatest benefit that I drew from the LS in the academic concept of the Arabic language, being my subject of specialization, is an increased passion for the classical Arabic Language in terms of		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		continuous practice. T3		
9	knowing the difference between teaching and learning	I now understand that how I think about something is not necessarily how my students look at it. This means that there is more than one process of coming up with the correct answer T6		
10	increased readiness for discussion	LS helps to increase the readiness of teachers to discuss any academic work, most especially areas related to their field of specialization. SL4		
11	increase in performance	It is clear that this model plays an important role in increasing performance for teachers. SL2	Improved teaching-related skills Evidence suggesting influence of LS	
12	performing better	LS is helping the teachers to develop their performance.	on teachers' teaching-related skills that	

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		They are more developed this year than last year... LS gives teachers more time for planning which leads to improving the performance of teachers. SL2	enhances better outcomes	
13	more self-confidence	The LS helped me to be more self-confident and comfortable with my subject area T1		
14	self-confidence	It has helped me to acquire an enhanced level of self-confidence with respect to teaching the Mathematics syllabus. T8		
15	improved and detailed lesson plans	... after participating in the LS, ... we now take our lesson planning and preparation very seriously and are now capable of preparing improved and detailed lesson plans. T9		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
16	avoiding shortcuts	<p>This is another indication of teacher development... they are beginning to spend more time in planning, observation and reflecting. This means that they are valuing their work more and avoiding shortcuts....</p> <p>SL4</p>		
17	consistency	<p>... LS is helping us to stick to what we have planned. This makes the lesson plan format ideal for preparing teaching-learning activity. (T4).</p>	<p>Changes in the beliefs and attitudes of teachers.</p> <p>Evidence suggesting influence of LS on teachers' beliefs and attitudes about the teaching and learning process</p>	
18	confidence booster	<p>Participating has helped me to feel a heightened sense of confidence in my ability to explain in detail the concepts of the subject of science to my students. T4</p>		
19	planning as a group	<p>...we were preparing lesson plan individually but now</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>we are planning in groups in a collaborative manner. This is helping in the teaching-learning process. (T 11).</p>		
20	<p>more comfortable in teaching</p>	<p>The LS has helped me to become more comfortable teaching the Arabic language. T10</p>	<p>Building confidence in the ability of teachers to teach their subjects of speciality. Evidence suggesting influence of LS on teachers' confidence that enhances their ability to teach their subject areas</p>	
21	<p>confidence building</p>	<p>Participating has helped me to feel a heightened sense of confidence in my ability to explain in detail the concepts of the subject of science to my students. T4</p>		
22	<p>enhanced self-confidence</p>	<p>It has helped me to acquire an enhanced level of self-confidence with respect to teaching the Mathematics syllabus. T9</p>		
23	<p>enhanced competence</p>	<p>The LS has helped me to become more competent teaching</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		the subject of science.T7		
24	better understanding and specialisation	The LS helps the teacher to acquire a heightened sense of self-confidence due to better understanding of concepts related to his subject of specialization. SL4		

Enhancing the PCK of teachers

Participants talked about concrete ways LS increased their Pedagogical content knowledge.

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
25	The provision of frequent and timely feedback.	Many students have increased timely feedback after we started using LS which encourages them to participate in the discussing and contribute to sharing feedback effectively T3.	Use of Best Practices Evidence suggesting influence of LS on teachers' use of best practices in lessons delivery	Enhancing the PCK of teachers Participants talked about concrete ways LS increased their Pedagogical content knowledge.

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
26	emphasizes best practice	<p>The LS model emphasizes the best practice that gives all students a learning opportunity that suits each individual student, taking due account of his abilities and interests and the understanding the importance of linking subject being taught to real life. T8</p>		
27	Being resourceful	<p>.... it means thinking outside of the box ... T6</p> <p>... possess the right qualities and the desire as well as ability to procure supplies or engage in something that would otherwise looked to be an unattainable resource.</p> <p>Some teachers can always seem to find a way to get it done...T9</p>		
28	Providing new opportunities	Simulating the real world, for instance,	Making learning active.	

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
	using real-world examples	peer-review activities and role play helps to bring the real world into the classroom T6.	Evidence suggesting influence of LS on teachers'	
29	effective classroom discussion	through effective classroom discussion, teachers are able to expose students to a variety of opinions and ideas that may or may not be similar to their own thereby making the learning process active. SL 1	teaching that makes it more practical and encourages active participation	
30	innovative ways of sharing information	the use of LS in of classrooms offers a perfect forum for teaching students to respect others and learn to share information, agree, and disagree in a productive and nonthreatening manner. SL 3		
31	Allowing for student participation during lessons	..., we now have a better understanding and appreciation of the challenges facing		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>students in their learning and try our best to make our lessons practical and student-centered. This strategy is proving to be more effective in meeting their needs and it seems to be promoting active learning. T9</p>		
32	<p>considering the bigger picture</p>	<p>now we consider the bigger picture more...for example, I now consider where my students are coming from and where they're going and what my little contribution means in their progression towards that end goal. T8</p>	<p>Understanding how children learn their subjects Evidence of teachers exploring new ways of how pupils learn their subjects</p>	
33	<p>awakening understanding</p>	<p>... Like I said, they might know two plus two is four just because they've memorised it, but that doesn't mean they know that they're joining two groups</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		together. Or when they subtract, they're taking things away. My role here is awakening such an understanding in them... T2		
34	making learning a lot more hands on	<p>I think my first few years of teaching, I thought, they have to be quiet, they have to be in their seats, they have to just be doing this andthat... But, now I use a lot more with math, OK, we're going to put out ten counters. We're going to turn of them six over. We're going to use inchworms to measure—and it's a lot more hands-on; a lot more of the investigations type math where they really have to do it on their own. We're measuring with inchworms. We're weighing things. We are using</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>connecting blocks to add things. It's a lot more hands on. They're actually doing it and they're actually seeing it, it helps them. It changes Math for them. And they can understand it. It's just more concrete and more meaningful to the students. T2</p>		
35	encouraging more risk taking	<p>Based on the LS that we did, we learned very quickly that these kids are... we had a hard time getting them to try some other strategies. They are very comfortable with one or two strategies. And, we found that the strategies that they're comfortable with are a lot of times are the same problem solving strategies that are used across the board regardless of a teachers'</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>understanding of the Math. The kids were very, very reluctant to kind of put themselves out on a limb a little bit and say, hey, there are two or three ways I could do this, but I'm going to take a risk in trying it this way. They are so conditioned to do repeated addition for a multiplication problem and that's all that we saw. And when we asked them to try and come up with another way to solve that problem, they struggled. T4</p>		
36	evidence-based learning	<p>It [Lesson study] forces you to look for evidence of what they understand in you're doing. That it's one thing to stand up and ask questions and go around and see what they're doing, but it's another thing to base</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>the next step in your lesson on what you see.....you're considering what they're doing and what that means according to what they understand. I'm considering what they show—and what they say and how that represents what they know. SL1</p>		
37	creativity in the delivery of lessons	<p>With Lesson Study, I became aware, as I increasingly walked around the classroom, listening, for evidence of student-learning. I really started to pay attention to what the kids were saying to each other. Just by what I could hear, I would figure out where somebody was not understanding a concept, or where one student would be</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		grasping a concept easily SL3.		
38	Improvement in lessons	Our lessons now are better than the earlier lessons because we are using better teaching-learning strategies when compared to the earlier lessons... For example, I was able to use ants as teaching-learning resources in one of my science classes... I did not do this in the previous year when I taught the same topic. T1	Changes in the use of teaching-learning strategies Evidence of teachers exploring new teaching-learning strategies in their day-to-day teaching	
39	Acceptance and use of alternative strategies	... having an understanding of the practical problems of students helps in designing a teaching style or method that helps them to learn.... T3		
40	Use of teaching aids	in previous practices, the teachers did not rely much on teaching		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>aids, but now teachers bring the necessary materials and create an environment for the students to use them in class during lessons... So, even though the methods may be the same, there is huge improvement in the delivery method...SL2</p>		
41	identification of alternative teaching methods	<p>... The LS model contributes positively to the planning process, and helps to identify alternative teaching methods that will be suitable for the learning needs of the different type of students... T2</p>	<p>changes in teaching methods (using new learning ways of teaching) Evidence of teachers exploring new teaching strategies and using innovative teaching methods</p>	
42	better strategies for children with special needs	<p>... The LS model helps us to use alternative teaching strategies for students with learning difficulties/disabilities T4</p>		
43	creating learning opportunities	The LS model emphasises best		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>practice which gives all students a learning opportunity that suits each individual student, taking due account of his abilities and interests ... T8</p>		
44	<p>professionalism in long-term planning</p>	<p>The teaching skills acquired by teachers include the ability to professionally analyze content, development of long term and short term objectives, time management, diversification of strategies and inclusive planning according to student types and content analysis in support of services for the long term objectives SL3</p>		
45	<p>positivity in lesson planning & delivery</p>	<p>This will be positively reflected by a better teacher performance in the classroom and a good content knowledge, which will in turn positively</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>impact on student learning. This means that LS is contributing positively to the planning process... SL4</p>		
46	<p>exchange of knowledge and experience</p>	<p>Such programmes (LS) lead to the acquisition of greater experience, achieving a deeper understanding of the subject, as well as exchange of knowledge and experience among members of the study team T1.</p>		
47	<p>cater for learning needs of all students</p>	<p>The LS model contributes positively to the planning process, and helps to identify alternative teaching methods that will be suitable for the learning needs of the different type of students. T2</p>		
48	<p>Peer coaching</p>	<p>Peer coaching that takes place before lesson presentation is</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>beneficial to all teachers because it allows for an open discussion of the lesson, and thus help teachers to learn how to present ideas and acquire skills displayed by other teachers. So, a teacher will have learned a new skill and a new approach that may be helpful in lesson presentation later on T9</p>		
49	take individual differences into consideration	<p>Determining the needs of students at various levels in terms of activities and strategies that take individual differences in consideration T10</p>		
50	plan strategically	<p>With respect to teaching skills, my participation in LS has taught me how to assign a specific time and strategy to every part of the lesson T11</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
51	encourages mutual cooperation	Perceiving the significant influence of the LS model upon teaching skills through the activation of cooperative learning and mutual exchange skills and knowledge SL1		
52	develop various aspects of professionalism	The teaching skills acquired by teachers include the ability to professionally analyze content, development of long term and short term objectives, time management, diversification of strategies and inclusive planning according to student types and content analysis in service of the long term objectives SL3		
53	positive contribution to lesson planning	The LS model contributed positively to the planning process, alternative teaching methods and		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		determining the respective intelligence levels of learners SL4		
54	better planning	LS has helped me to plan better and has assisted me to view the crux of a smooth lesson T3		
55	positive impact on learning	LS has impacted positively on my learning of science by supplying me with new strategies of planning, teaching and evaluating T6		
56	better self-confidence	It helps the teacher to achieve a heightened level of self-confidence as a result of preparing a better lesson plan T7		
57	helpful in prioritizing	LS leads to better prioritization in the context of the lesson and ensures teaching the information in a gradual manner (good lesson preparation) SL2		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
58	entrenches ownership of work	LS helps in better lesson planning and preparation to such a degree that it makes teachers to be in command of what they are doing SL4		

Building a collaborative learning community

Participants provide evidence of teachers working collaboratively which leads them to create a professional learning community inside the school.

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
59	Working with peers and sharing ideas	excellent teachers are earnest learners. They are always willing to spend some time with a colleague, or two, and share their opinion on matters that has to do with best classroom practices ... SL2	Collaboration between teachers Evidence to suggest that teachers' participation in LS is encouraging them to work	Building a collaborative learning community Participants provide evidence of teachers working collaboratively

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
60	peer observation	<p>... LS has given us the opportunity to sit down with colleagues and observe what we do as a collective... we are usually in our own environments and we don't even know that other people are doing...not having the opportunity to watch others corroborate what you do is not the best... experiencing other teachers teach the same thing differently helps you...</p> <p>T3</p>	collaboratively with other teachers	which leads them to create a professional learning community inside the school.
61	congruence in lesson planning and delivery	The LS has helped us to stick to what I plan to teach because I know my peer observer knows what I am supposed to be		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>doing... This brings about congruence in the lesson planning process and its execution... T1</p>		
62	<p>increasing collaboration</p>	<p>I could say that after implementing LS, collaboration has been increased. LS provided teachers opportunity to collaborate more. They now prepare lesson plan together... During LS they plan and work as a team.. After planning when one teacher teaches the lesson the other teachers observe the lesson. I believe that collaboration has been obvious now after LS.</p> <p>SL3</p>		
63	<p>classes visitation and teacher observation</p>	<p>Among the best beneficial experiences that I gained from taking part in the LS is being able to work with colleagues in a collaborative manner,</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>visit classes and observe how teachers teach and how students learn, which is something I had never done... T1</p>		
64	<p>feedback during debriefing sessions</p>	<p>There is more collaboration amongst teachers because they prepare the lesson plans in collaboration with others and they observe each other's ways of doing things. During observation, they check whether the lesson has been implemented as planned and they provide feedback during debriefing sessions SL1</p>		
65	<p>plan lessons with colleagues</p>	<p>I was able, through the LS model, to practice high-level collaborative work with colleagues, plan lessons with colleagues teaching the same subject and grade</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		and to visit their classes. T10		
66	peer support	<p>... having the opportunity to work collaborative with my colleagues and to gain their inputs when the observation is complete is beneficial.</p> <p>I don't know everything in my subject area... so, working with others makes my job a little easier because of the support they provide.</p> <p>T9</p>		
67	work collaboratively	<p>To be honest, I've never before known collaborative work, but now I am able to work collaboratively with colleagues..., the benefits from this are many including gaining more experience and becoming more comfortable than ever before to share or</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>exchange ideas in a groups T11</p> <p>... the LS activities enhance teachers' ability to collaborate with colleagues... T2</p> <p>collaboration was one of the reasons they introduced LS in the KSA. SL1</p>		
68	pay visits to colleagues	... taking part in the LS enables teachers to work with colleagues in a collaborative manner, pay visits to each other's classes and observe how they teach and how their students learn..., this is something no teacher had ever done...SL4		
69	embrace teamwork	... the LS model helps team members to embrace teamwork... T3		
70	exchange of ideas	To be honest, I've never before known collaborative work, but		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>now I work collaboratively with colleagues, benefit from those with more experience more comfortable than ever before and exchange ideas with them... T11</p>		
71	effective engagement and group work	<p>The LS model guides teachers to collaborative group work, with both its literature and charter urging free brainstorming and effective engagement by all so that everyone becomes partners in success or subject to critical comments... T10</p>		
72	team spirit	<p>Embracing the team spirit enhances collaborative work at school... T7</p>		
73	mutuality	<p>It helps with mutual guidance and exchange of experiences among teachers. T9</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
74	Helping build teacher confidence	Until the introduction of the LS programme in my school, I use to work on my own, and I was always shy to engage with my colleagues. But now I am more confident and reach out to other teachers who are teaching the same or similar subjects in the school... T9		
75	engage students actively	making learning active also means, offering students opportunities to be actively engage in their learning journeys, ideally right from planning to delivery. T11	Collaboration between teachers and students Evidence of collaboration	
76	Student learning	Prior to our participation in the LS, our teaching was characterised by teacher-centred methods. Now, we have shifted our teaching to a more	between teachers and students as a result of teachers' participation in LS.	

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>student-centred learning method which allows for student participation rather than seeing them as passive recipients of knowledge. T2</p>		
77	<p>student-centred teaching approach</p>	<p>Prior to my participation in the LS, I thought it was not practicable to teach effectively using student-centred approach, but my participation in the LS programme has change my perception... T1</p>		
78	<p>children's participation in lesson planning and delivery</p>	<p>it was unthinkable to find teachers and students sitting together to discuss and plan activities that will promote effective teaching and learning. We were developing the lessons as teachers and implementing them without considering the actual</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		needs of the student.... T4		
79	allowing for the voices of students	<p>... we are beginning to see that some of our teachers are allowing for the voices of students to be heard in their teaching and they are actively encouraging this....</p> <p>However, the majority of teachers are still very conservative in the relationship with students. I think this partly cultural because our culture makes that distinction and teachers expect due respect from their students and nothing else. Therefore, they don't see how they should work collaboratively in order to promote effective teaching and learning ..SL1 and SL4</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
80	building partnerships and working together as a team	<p>... we are definitely working better together as a team now more than ever, taking on board the views of everyone, that is, students, teachers and school leaders... this means that everyone is getting to know more about our roles and the roles of each other in the teaching and learning process... T7</p>	<p>Collaboration between teachers, students and school administration Evidence of collaboration between teachers, students, and school administration as a result of teachers' participation in LS.</p>	
81	effective engagement through building partnerships	<p>The LS model provides guidance as to how to engage in collaborative work, and the benefits of effective engagement by all so that everyone becomes partners in success or subject to critical comments T10</p>		

Contribution of LS in breaking the culture of isolation

Evidence suggesting influence of LS in breaking the culture of isolation among teachers and encourages them to work together more.

No	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
82	Working in isolation	We are used to working on our own during our lesson preparation and at the time of teaching... T1	breaking the status quo	Contribution of LS in breaking the culture of isolation Evidence suggesting influence of LS in breaking the culture of isolation among teachers and encourages them to work together more.
83	able to ask for help	We are now able, through the LS model, to ask for assistance from our colleagues and superiors which is something we would never have done some time ago. Therefore, LS is helping us to break the culture of isolation. T10	Evidence suggesting that teachers are doing things differently that encourages them to work together more.	
84	building and consolidating working relationships	LS has helped us to consolidate our working relationships and build new ones... these are all helping us break the culture of isolation which was facing teachers... SL3	Working collaboratively Evidence of teachers working collaboratively to minimise isolation among themselves.	
85	Enhanced peer support and able	We are now able, through the LS model,		

No	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
	to seek help from head teachers	to ask for assistance from our colleagues and superiors which is something we would never have done some time ago. Therefore, LS is helping us to break the culture of isolation. T10		
86	Openness and transparency	The LS model has enabled us to be more open and transparent about what we are doing at any given time to other members of the team. T4	embracing democratic principles Evidence suggesting teachers are more open, transparent and accountable about what they do.	
87	Greater accountability	This is helping us to change our way of doing things both in and outside the classroom. LS is helping us to become more accountable for decisions we take and things we do and above all we feel less isolated... T11		

No	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
88	opening channels of communication	All these activities are done in groups and involve communication at all times. This helps in breaking the culture of isolation. SL1		
89	fear of criticism or being judged	I can say that LS has helped to unblock most of the barriers that were blocking teachers from collaborating with one another or working in teams. Some of these barriers were the negative feelings that the teachers were holding regarding being observed, the fear of being evaluated, or the fear of being belittled by colleagues... SL3	other barriers that contribute to isolation Evidence suggesting the influence of other factors that contributes to the culture of isolation among teachers.	
90	working within boundaries	We are used to working on our own during our lesson preparation and at the time of teaching. With LS encouraging us to work collaboratively, it		

No	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		has helped us to break this barrier T1		
91	old ways of doing things	The LS model has enabled us to be more open about what we are doing at any given time to other members of the team. This is helping us to change our way of doing things both in and outside the classroom. T4		

Benefits of LS model in the KSA

Evidence suggesting general benefits of participating in LS or impact on the participant.

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
92	widening their horizon in teaching	... Such continuous professional learning involves utilizing personal experiences and knowledge as well as breaking free from the cocoon of our	Teacher performance Evidence suggesting influence of LS on teacher performance in	Benefits of LS model in the KSA Evidence suggesting general benefits of participating

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		individual perspectives of subjects of specialization helps in widening or horizons... T8	the classroom and its impact on students	in LS or impact on the participant.
93	renewed self-confidence in their ability to teach	... It has helped me to acquire an enhanced level of self-confidence with respect to teaching the Mathematics syllabus... T2		
94	quality in lesson preparation and delivery	... it channels ideas of the thought of a whole team into producing the best possible method of lesson presentation in terms of quality, professionalism and skill, all with the sole aim of improving student outcomes... T7		
95	increased passion	The greatest benefit that I drew from the LS in the academic concept of the Arabic language, being my subject of		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		specialization, is an increased passion for the classical Arabic language in terms of continuous practice... T3		
96	identifying gaps in students' learning	The LS further enabled me to determine which lessons constitute a gap in students' learning... T4		
97	more time for planning	LS is helping the teachers to develop their performance. They are more developed this year than last year. It is clear that this model plays an important role in increasing performance for teachers. LS gives teachers more time for planning which leads to improving the performance of teachers... SL2		
98	upgrading themselves	One can clearly view that there is		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>development not only in pupils but also in the teachers. They are upgrading themselves.</p> <p>As a result, the teachers are developing with LS in their performance...</p> <p>SL3</p>		
99	provision of useful T/L resources	<p>LS has provided teachers with numerous resources which are beneficial to them and can help to enhance their performance...T11</p>		
100	renewed love for the teaching profession	<p>The greatest benefit for me is that it has renewed my love and desire to teach the Arabic language... I have become more passionate in carrying out my day-to-day activities as a teacher which was not always the case before my participation in the LS programme... T9</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
101	more experience	participating in LS has helped in the acquisition of more experience, this results in better teacher performance in class and a good delivery of content knowledge which is reflected in enhanced student learning... T1		
102	greater understanding	a greater understanding of the content of the subject through knowledge exchange among the participants... T1		
103	opportunities for quicker integration	LS enhances the performance of new teachers and less experienced teachers most of all, by providing them with the opportunity to quick integration into a motivated teaching environment...T4		
104	deepening understanding	... LS can support some experienced		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>teachers by providing them with the opportunity to maximize performance and incorporate their experiences into their teaching T4</p>		
105	<p>acknowledges and appreciates individual differences</p>	<p>LS model helps teachers explore the behavioral objectives that students are expected to learn during the execution stage and look for the appropriate strategies that take into account individual differences among students and students with learning difficulties/disabilities, which has a direct impact in terms of enhanced teacher's performance and improved application of teaching strategies... SL2</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
106	formation of lasting connections within teams	<p>The LS model, through its emphasis upon professional education communities and school-based professional development, is greatly impactful in terms of enhanced teachers' performance and formation of lasting connection and cooperation between team members, who are encouraged to embrace the team spirit</p> <p>SL3</p>		
107	resource to other teachers	<p>LS reports provide a beneficial resource to other teachers which lead to improving teachers' performance</p> <p>T11</p>		
108	linking all fields	<p>LS model is firmly related to the STEM approach, which aims at linking all fields. T9</p>		
109		<p>LS model highlights and enhances the</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>teacher's positive aspects, while discovering teaching deficiencies and helping to find solutions for such deficiencies. T7</p>		
110	solution oriented	<p>... the LS model has helped me to introduce changes into my daily activities, thus making me more capable of formulating my long term objectives and fulfilling them... However, support by the school management is a must, taking into consideration all impediments to timely execution, including insufficient training of some teachers on the model's execution mechanism... T3</p>	<p>Teaching practice Evidence suggesting influence of LS on teaching and methods of teaching</p>	
111	long-term objectives	<p>In the past, I only focused on short term objectives. However, having taken part in</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		the LS, I began to pursue my daily activities with more emphasis on long-term objectives. T6		
112	link between the present and future objectives	Before I took part in the LS, there was no connection between my short-term and long-term objectives. But now, I've begun to link my daily activities to long-term objectives. T9		
113	continuity in teaching practices	In fact, all procedures undertaken, using the LS model, are very valuable for teachers wishing to continue their teaching practices over the long-term. T11		
114	heightened sense of effectiveness	LS is helping us to reflect more on our role as teachers and make changes to our motivations as professionals. In fact the post-lesson		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		observations and feedback we get from colleagues also help us to acquire a heightened sense of effectiveness... T4		
115	deepening understanding	LS is most effective in deepening the understanding of teachers because of the collaborative component which provides them with opportunities to share good practices and learn from them... T6		
116	building teacher confidence	Speaking for myself, I can say that I am much more confident in my ability to handle my subject and I guess it is the same with my colleagues... LS is a confidence booster, she added.... T10		
117	demanding but rewarding	It is an effective model, but for its proper implementation teachers need to apply		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>themselves at work and to read extensively to accumulate the required information. This is what helps in deepening their understanding of the subject area... SL2.</p>		
118	<p>enhanced motivation/working towards professionalism</p>	<p>This model enhanced teachers' motivation to achieve professional development, realizing that professional development is part and parcel of their duties and responsibilities and an integral part of the teaching profession. Therefore, continued professional learning, utilization of experiences and knowledge and breaking free of the cocoon of their respective subjects of specialization, collaborative learning, knowledge, and</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>experience sharing and recycling lead to sustainable professional development and continuity within the work environment SL3</p>		
119	exposure to best approaches	<p>Peer coaching and experience exchange are beneficial to all as the discussion of lesson content and review of all ideas help us determine the best and soundest method of presenting the information to the student in a correct, easy and creative manner. For example, a colleague gave us the name of a book in grammar that he thinks is helpful to a freshly appointed school teacher, so we all ordered it for its significant impact upon our teaching performance T11</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
120	opportunity for different ways of learning	LS provides students with varied ways of learning and understanding the subject they are studying T1		
121	quality and professional presentations	LS has a considerable impact upon student learning as it channels ideas of the thought of a whole team into producing the best possible method of lesson presentation in terms of quality, professionalism and skill, produced by a team that meet more than once to determine the questions and the steps of lesson presentation T7	Improving students' outcomes Evidence suggesting influence of LS on student learning outcomes, including knowledge, skills, and learning habits.	
122	deepening student understanding	The LS model helps develop research, enhance preparedness and deepen understanding of students, encouraging team work, role		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		distribution and evaluation of material learned T11		
123	empower students to discover information	LS helps the student to discover the information by himself, using appropriate tools and varied methods, thus developing his ability to look for information, deepen his understanding of the lesson and making information thus acquired more lasting SL1		
124	boost students confidence	LS gives students a sense of initiative and makes them effective elements in the lesson by activating several strategies, enhancing the student's self-confidence and polishing their skills SL4		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
125	enhanced student level of learning	<p>These meetings lead to acquisition of more experience, a greater understanding of the content of the subject, exchange of knowledge and experiences among members of the study team, which in turn is reflected upon a better teacher performance in class and a good knowledge content that is reflected in enhanced student level of learning T8</p>		
126	positively impact on student learning.	<p>Such programmes (LS) lead to the acquisition of greater experience, achieving a deeper understanding of the subject, as well as exchange of knowledge and experience among members of the study team. This will be positively reflected by a better teacher</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		performance in the classroom and a good content knowledge, which will in turn positively impact on student learning T1		
127	motivates teachers and students	This new model, which motivates both teachers and students, is a very good process and a new teaching method that I'd like to see implemented in all schools of the Kingdom of Saudi Arabia. T2	Changes in motivation and sense of effectiveness Evidence suggesting influence of LS on teachers' motivation, sense of effectiveness and collaboration as well as a desire to become well informed in their teaching	
128	heightened sense of effectiveness	Because of post-lesson observations, teachers acquire a heightened sense of effectiveness T4		
129	develop motivation	The LS model helped me understand that motivation leads to effectiveness and further helped me develop such motivation. T6		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
130	renewed and transferable excitement	I'm excited, having completed the LS course, and my excitement has been picked up by my students, who have become active participants. T8		
131	enhance a sense collaboration	Collaboration with colleagues helped me enhance my sense of motivation, which is a sense I've never had before the execution of this program. T10		
132	lessons are well-informed	It is an effective model, but for its proper implementation a teacher needs to apply himself at work and to read extensively to accumulate the required information. SL2		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
133	achieving professional development	<p>This model enhanced teachers' motivation to achieve professional development, realizing that professional development is part and parcel of their duties and responsibilities and an integral part of the teaching profession. Therefore, continued professional learning, utilization of experiences and knowledge and breaking free of the cocoon of their respective subjects of specialization, collaborative learning, knowledge, and experience sharing and recycling lead to sustainable professional development and continuity within the work environment.</p> <p>SL3</p>		

Challenges of LS model in the KSA

Obstacles to engaging in effective LS practice in the KSA

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
134	time constraints	<p>... we have insufficient time for collaboration in our schools as required by LS... for instance, most of the teachers in primary schools have to have 5 hours contact time in class daily. If they are contracted to work 7 hours in a day, that means that there is very limited time for any collaborative work with other teachers as required in LS... This is a major difficulty with implementing LS.</p> <p>T5.</p>	<p>Teaching related (teachers)</p> <p>Teaching related obstacles to implementing LS effectively</p>	<p>Challenges of LS model in the KSA</p> <p>Obstacles to engaging in effective LS practice in the KSA</p>
135	time for working together	<p>LS requires time and most of the teachers do not have time for working together T2</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
136	time to conduct meetings	<p>time is the biggest challenge for me because often times it is difficult to find free time to conduct meetings if you want to collaborate with other teachers... therefore, the LS initiative is a brilliant idea but our times do not allow us to do so. T6</p>		
137	Schedule time	<p>The challenge is insufficient time for collaborative LS activities at school. Schedule time is limited in primary school (just 7 hours) and most of the teachers work in class for 5 hours. This is a major difficulty with implementing LS... SL2</p>		
138	Insufficient support and training	<p>Some teachers still lack both CK and PCK as a result of insufficient support</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		and inadequate training. This impacts negatively on the quality of LS implementation... SL4		
139	lack of resources	teachers lack sufficient support and resources which will help them in their implementation of LS... T9		
140	Misconceptions of LS	I think that some teachers need more orientation about implementing LS effectively because some of them appear not to have sufficient understanding of LS. SL1		
141	lack understanding of the purpose of LS	Some teachers still lack sufficient understanding of the purpose of LS which is emanating as a result of the lack of appropriate training... T12		
142	Lack of CK and PCK	The majority of the teachers suffer from a		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>lack of content knowledge and pedagogical content knowledge when implementing LS resulting in low benefits from LS...</p> <p>SL3</p>		
143	<p>Negative attitudes about LS among some teachers.</p>	<p>when we started with participating in the LS model, some teachers have a negative attitude toward this model and its effectiveness in teaching practice and teachers performance as well as students' achievement. T3</p>		
144	<p>Lack of training programmes</p>	<p>I think that some teachers need more training programmes about implementing LS effectively because some of them do not have sufficient understanding of LS...</p> <p>SL4</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
145	Bureaucracy from administration	...effective implementation of LS requires 100% administrative support... this influences the quality of the LS and has to be continued, which is not my experience here so far... T12	Administration related (school leaders) Obstacles limiting school leaders to implementing LS effectively.	
146	Bureaucracy from Educational Authority	one needs to go through a lot before you're accepted to join the LS programme even though we are told it is mandatory. It will be easier if this is made straightforward... SL1		
147	lack of support from the top	At the moment there is nobody in charge of the LS programme in our district. This is one of the major challenges. I think that there's interest in the programme on the part of teachers and students, but we don't		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>have an administrative leader who will take charge of the LS programme and encourage participation across schools...</p> <p>Honestly, this is affecting the enthusiasm of the teachers about the programme... SL2</p>		
148	a rushed programme	<p>... I think our LS programme was rushed because our activities do not look well planned. For instance, they use a day to train us on things that should take about a week... I think they need to plan for the long-term for LS to work effectively... T5</p>		
149	lack of long-term planning	<p>I think we need to have a long-term plan for the LS programme... this plan should be made up of views of all stakeholders including teachers, students,</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>administrators and policy makers. If we are able to do this and plan for the future, this will be better for all of us and will lay a solid foundation for the successful future implementation of the LS programme... SL3</p>		
150	Lack of policies and procedures	<p>You would think that with our country's worth of resources, we would have everything we need, when we need it. But unfortunately it is not always the case. For example, as a result of the lack of policies and procedures we sometimes don't have printed materials necessary for LS practice... T7</p>	<p>Policy related challenge Policy related obstacles to implementing LS effectively.</p>	
151	gap in policy and procedure	<p>the MoE is trying their best to catch up with happenings in our schools. I admit the LS programme was rushed</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		<p>but I guess the thinking behind it was that we could adopt LS programmes from other countries. Now, we realize what we need to do such adaptation so that it fits into our culture and context... all these considerations are partly responsible for the gap in policy and procedure.... SL1</p>		
152	Sustainability	<p>... using LS is expensive in terms of time and required administrative resources.. for example, some teachers may not have sufficient understanding of LS and may need more training programmes about implementing LS effectively... .. making LS sustainable means that it has to be made an integral part</p>		

NO	Initial codes	Linked data -that is, evidence from transcripts	Sub-category & definition	Category & definition
		of the professional lives teachers... T9		
153	it needs to be rooted in our culture	For LS to be sustainable here in Saudi Arabia, I think it should be adapted and made rooted in our culture... T1		
154	the need for a shift in cultural views	making LS sustainable in this country is certainly going to be a challenge, as it requires a shift in cultural views toward professional development.. SL1		