

**A Cross-case Study of Knowledge Leadership for Creation and
Transfer of Small Class Teaching in two local primary schools: Using
the SECI Model as an Analytical Lens**

By

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Statement of Originality

I, Tang Yiu Nam, hereby declare that I am the sole author of the thesis and the material presented in this thesis is my original work except those indicated in the acknowledgement. I further declare that I have followed the University's policies and regulations on Academic Honesty, Copyright and Plagiarism in writing the thesis and no material in this thesis has been submitted for a degree in this or other universities.

Abstract

Schools in HK are facing the need to deliver quality education and demonstrate accountability, which has resulted in performance pressure on schools. The effective implementation of SCT is crucial for enhancing the quality of education in schools. However, implementing SCT presents challenges in teacher learning and pedagogical design due to limited time and resources. Therefore, the adoption of KM is crucial in addressing these challenges.

Applying purposive sampling, this study selects two aided primary schools, namely X School and Y School, as the cases for investigation due to their differing levels of instructional capacity and attractiveness in parental choice. It is noteworthy that Y School has been more successful than X School in this regard. Documentary review, lesson observation, and in-depth interviews with principals, vice-principals, PSMCD, middle managers, teaching mentors, and novice teachers are utilized for data collection from X School and Y School. A mixed approach of deductive coding and inductive coding is used to analyse the documentary, lesson observation, and interview data collected.

The study is guided by the SECI KM model of knowledge creation and transfer, which functions as an analytical lens for the development and execution of Collaborative Lesson Preparation activities in X School and SCT Learning Circles

activities in Y School, respectively. These activities serve as crucial KM tools and strategies for SCT knowledge creation and transfer within their respective schools.

Its goal is to establish a connection between three-tiered knowledge leadership practices, KM, and SCT implementation in primary schools. This study utilizes cross-case studies with rich empirical data to develop a testable theory regarding knowledge leadership in HK primary schools.

The study concludes that the strategies of codification and personalization within KM can assist schools in addressing the identified problem and promoting effective SCT implementation. KM not only enhances teachers' SCT competency but also improves the administrative structure and pedagogical policies of the school. Moreover, it helps prevent the loss of SCT knowledge by capturing and retaining the knowledge of experienced teachers and strengthening the SCT knowledge of novice teachers. The research further identifies how teachers, middle managers, and principals enhance leadership practices and organizational factors that facilitate SCT implementation.

Three-tiered knowledge leaders in schools play a crucial role in promoting SECI process of SCT knowledge creation. The organizational factors that support KM and SECI processes for effective SCT implementation include knowledge leaders as role models, alignment with the school's vision and mission, high collegial trust, a culture

of knowledge sharing and collaboration, supportive infrastructure, professional development opportunities for teachers, and partner's support. Employing three-tiered leadership practices and organizational factors can institutionalize the SECI model in schools for SCT knowledge creation, enabling effective SCT implementation.

The study reveals that the three-tiered knowledge leadership, aligned with the three levels of PDCA cycles in the Learning Circle, can collaborate with SCT knowledge assets and *Ba* to serve as the major driving force for the SECI knowledge creation process. This collective effort fosters the conversion and creation of both tacit and explicit knowledge within the SCT framework.

Keywords: Knowledge management, Knowledge leadership, Three-tiered

Knowledge Leadership, Small Class teaching, SECI model, Primary school.

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List of Abbreviations

ASP	Annual School Plan
ASR	Annual School Report
CoP	Community of Practice
EDB	Hong Kong Education Bureau
EdUHK	The Education University of Hong Kong
ESR	External School Review
FI	School Focus Inspection
FMS	File Management System
HK	Hong Kong
IC	Intellectual Capital
ICT	Information and Communication Technology
KM	Knowledge Management
LS	Lesson Study
OECD	The Organization for Economic Cooperation and Development
P1	Primary One
PDP	Professional Development Program
POA	Primary One Admission
PSMCD	Primary School Master/Mistress (Curriculum Development)
REO	Regional Education Offices
QAD	Quality Assurance Division
QEF	The Quality Education Fund
QSIP	Quality School Improvement Project

UNESCO	The United Nations Educational, Scientific, and Cultural Organization
SCT	Small Class Teaching
SDP	School Development Plan
SES	Socioeconomic Status.
SSE	School Self Evaluation
TSA	Territory-wide System Assessment

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CHAPTER 1 INTRODUCTION

Primary schools in Hong Kong (HK) have implemented Small Class Teaching (SCT) since 2009-10 to improve education quality. However, a lack of pedagogy has hindered effective SCT implementation. Knowledge management (KM) is regarded as a potential strategy to address these challenges. The objective of this study is to examine how the utilization of KM influences the implementation of SCT, proposing that educational institutions can employ KM to improve teachers' abilities, harness Pedagogical Content Knowledge (PCK), and foster school advancement. Consequently, the adoption of KM empowers schools to effectively implement SCT.

According to Cheng (2019a, p.18), KM “refers to the process that enables retrieving, sharing, applying, storing and creating knowledge to maximize it within the organization”. The involvement of principals, middle managers, and teachers is crucial in implementing KM, but research on their three-tiered knowledge leadership practices is lacking. The objective of this study is to address this deficiency by furthering comprehension of three-tiered knowledge leadership practices in the implementation of KM.

Despite KM's recognition in the business world (Chu, 2013; Chan, 2022), its application in schools is limited, as pointed out by Chu (2016a) and Chan (2022). Schools are knowledge-intensive organizations (Fullan, 2002; Kazal, 2021), and

principals, middle managers, and teachers play a vital role in managing knowledge domains. They need competence in KM and leadership skills (Kazal, 2021). Effective knowledge leadership practices can establish a knowledge-sharing culture, enhance KM practices, and promote SCT implementation.

Nonetheless, the existing body of research on knowledge leadership practices in schools is insufficient (Chu, 2013; Hu, 2017, 2019; Kazal, 2021; Chan, 2022). Hence, the purpose of this study is to make a valuable contribution to the advancement of KM within schools and address the knowledge gaps pertaining to KM implementation and three-tiered knowledge leadership. Specifically, it focuses on school-level, curriculum-level, and pedagogical-level of KM related to SCT, which are essential aspects of primary school education and a school's intellectual capital (IC).

1.1 Background of the Study

HK public schools face challenges in maintaining quality education due to declining student numbers, increased accountability standards, and parental choice. Factors contributing to the decline include falling birth rates, emigration, enrollment in overseas private schools, and the impact of the COVID-19 pandemic. The Education Bureau (EDB) highlights the declining fertility rate in HK since 2016, with only 32,500 newborns in 2022, indicating a structural decline in the primary school-age population. The EDB emphasizes the importance of a “soft landing and gradual

approach” to address this issue (EDB, 2023a).

Many schools are facing cutting classes due to the situation, according to Aided Primary School Heads Association vice-chairwoman Polly Chan Suk-ye (Ng & Yiu, 2023). Primary School Principal Vu Im-fan suggests implementing SCT across the territory to tackle this problem (Yiu, 2022a).

However, the implementation of SCT has encountered the following challenges:

- (i) The main weakness of teachers is the inappropriate use of group work (Galton & Pell, 2009), which results in only marginal improvements in individualized attention when group work is utilized improperly (Galton et al., 2019);
- (ii) Teachers need time for planning, reflection, and evaluation of their SCT practices (EDB, 2010a). The heavy workload and other workplace factors hinder teachers from effectively leveraging SCT, leading to frustration and diminishing the potential benefits of SCT for students (Pow & Wong, 2017);
- (iii) Schools are unable to change the classroom layout to accommodate different learning tasks and types of learning discourse (Galton, 2010c);
- (iv) There is insufficient encouragement for students to critically reflect on the procedures and methods employed (Galton, 2010c). Schools can't utilize SCT as an opportunity to engage students in self-regulated learning (Galton, 2015a);
- (v) Teachers continued to dominate lessons using a teacher-directed approach,

which hinders the increase in student talk (Galton & Pell, 2012a) as teachers adhere to traditional teaching methods (Galton et al., 2019), and

(vi) Schools should encourage teachers to provide feedback and implementing Assessment for Learning (AfL) practices (Galton, 2015a).

This study suggests using KM in schools to enhance SCT implementation by addressing management, curriculum, and instructional challenges. It aims to examine knowledge leadership practices of principals, middle managers, and teachers in implementing KM through a cross-case study in two primary schools. The primary objective is to develop a theoretical model that explains the relationship between knowledge leadership, KM practices, and SCT implementation.

1.2 Rationale of the Study

1.2.1 Why studying the influence of KM on School Management for effective implementation of SCT?

EDB considers SCT as a critical strategy to enhance student learning effectiveness through smaller class sizes (EDB, 2010a). However, schools face barriers in implementing SCT effectively, hindering their ability to provide quality education and attract parents. KM can help schools overcome these challenges and enhance teaching and learning by effectively setting knowledge vision, fostering SECI knowledge creation process, utilizing knowledge assets, energizing *Ba* and aligning them with the direction of school development (Davenport & Prusak, 1998; Rastogi, 2000; Cheng,

2019a).

KM serves as a mechanism for educational leaders to access and leverage knowledge effectively, aiding in planning and executing teaching responsibilities (Nonaka & Takeuchi, 1995; Hansen et al., 1999; Zack, 1999; Cheng, 2015a, 2019a).

KM, a strategic management approach that originated from the business (Chu et al., 2011; Chu, 2013; Hu, 2019; Chan, 2022) and technology sectors, is recommended as a solution to help schools overcome challenges in enhancing school performance and improving teaching and learning (Chu et al., 2011; Chu, 2013; Cheng, 2017a, 2018b, 2019a; Cheng & Lee, 2016; Hu, 2017; Hu, 2019; Chan, 2022). According to Kazak (2021), KM is suggested to make a positive influence on school processes. The purpose of implementing KM is to empower different levels of knowledge leaders to capture and share the school's knowledge, thereby striving for a competitive advantage. Rastogi (2000) adds that KM involves creating knowledge assets and aligning them with school's needs.

By facilitating the retrieval, sharing, and storage of school's knowledge, KM can address issues such as document preparation (Chung et al., 2005; Cheng, 2017c; Hu, 2019), utilizing codification and personalization strategies (Chu, 2016a; Cheng & Lee, 2016; Cheng, 2017a, 2017c; Cheng et al., 2017), building Lesson study (LS) and communities of practice (CoPs) (Chu, 2016a; Shi & Cheng, 2018; Cheng & Lee, 2019;

Cheng, 2019a, 2019b, 2020, 2023a), enhancing curriculum management (Cheng & Lee, 2019; Cheng, 2019a, 2023a), improving teaching and learning, strengthening strategical planning (Cheng, 2015a, 2019c; Hu, 2017, 2019), building school IC (Cheng & Lee, 2016; Cheng, 2017; Cheng, 2023b), enhancing individual and organizational learning capacity (Cheng, 2012a, 2012b, 2013a), and promoting teacher involvement and ownership (Cheng, 2008b, 2008d, 2012b; Chan, 2020).

Hence, studying KM's impact on SCT implementation and its ability to address implementation challenges can guide schools in achieving successful implementation.

1.2.2 Why studying the three-tiered leadership practices for school KM implementation?

Schools can adopt KM to enhance the implementation of SCT. Knowledge leadership is critical in supporting and enabling KM implementation in schools.

Previous studies have presented substantial evidence highlighting the importance of leadership in the implementation of KM within organizations (Davenport & Prusak, 1998; Yeh et al., 2006; Foon & Yen, 2011; Bozdogan, 2013; Mas-Machuca, 2014; Besen et al., 2017; Hu, 2019; Chan, 2022). Given that school principals serve as the primary source of leadership in school settings (Day et al., 2010), they are considered crucial in the implementation of KM within the school context (Leung, 2010; Chu et al., 2011; Chu, 2016; Hu 2017, 2019; Chan, 2022). However, the knowledge leadership role of middle managers and teachers have not been explored yet.

Leaders have the ability to employ specific leadership practices that facilitate the implementation of KM within organizations (Crawford, 2005; Nguyen & Mohamed, 2011; Jain & Jeppesen, 2013; Micić, 2015; Stylianou & Savva, 2016; Özgözü & Atılgan, 2017). These leadership practices contribute to creating conducive conditions for successful KM implementation (Politis, 2002; Holsapple & Jones, 2007; Donate & de Pablo, 2015; Aktan & Vural, 2016). However, it is worth noting that most of the current studies primarily focus on the business sector and emphasize the corporate context when examining leadership practices for KM implementation (Chu et al., 2011; Chu, 2013; Hu, 2017, 2019; Chan, 2022).

There is a research gap in identifying specific knowledge leadership practices of principals, middle managers, and teachers in school KM implementation. School leaders play a crucial role in adopting and institutionalizing KM practices for effective SCT implementation. Investigating three-tiered knowledge leadership practices is necessary to implement KM successfully in schools. This study aims to bridge the research gap by examining three-tiered knowledge leadership practices within the school context, facilitating successful KM implementation.

1.2.3 Why use the SECI Model as an analytical lens?

In this study, the SECI model is employed as a theoretical framework. The SECI model has been extensively utilized to examine the knowledge process within

educational organizations (Wu et al., 2013; Cheng, 2015a, 2019a, 2023a), and Hislop (2013) has acknowledged Nonaka's knowledge creation theory, which encompasses the SECI knowledge creation model, as the most influential and widely referenced theory in the field of KM (See Fig. 1.1).



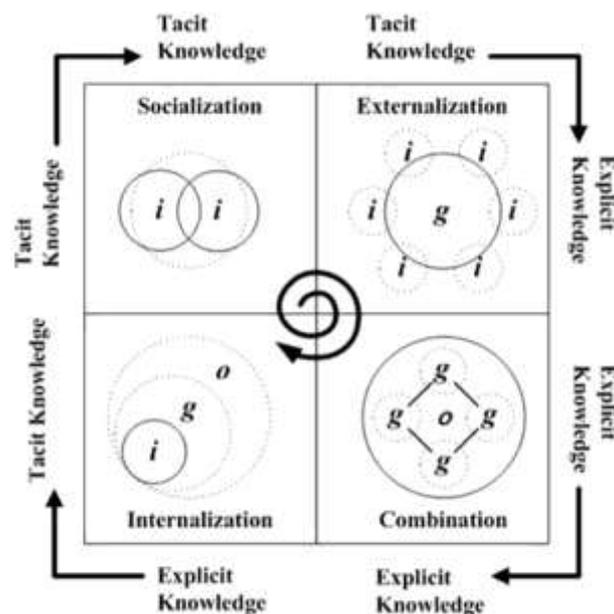
Fig. 1.1 The SECI Model (Nonaka & Takeuchi, 1995)

The SECI model (Socialization, Externalization, Combination, and Internalization), created by Nonaka (1991) and extended by Nonaka & Takeuchi (1995), is used to describe how explicit and tacit knowledge is generated, transferred, and recreated in schools. Nonaka & Takeuchi (1996) emphasized that the SECI model is crucial to knowledge creation and transfer theory.

The SECI Model (See Fig. 1.2) explains how tacit knowledge is converted into explicit knowledge and vice versa, providing the basis for individual, group, and organizational learning and innovation (Nonaka & Takeuchi, 1995). Nonaka (1994)

introduces the SECI model, which outlines four conversion patterns between tacit and explicit knowledge: socialization, externalization, combination, and internalization (Hussi, 2004; Nonaka & Nishihara, 2018).

The SECI model remains relevant in today's dynamic educational landscape, schools as organization must actively cultivate SECI knowledge creation capabilities to stay competitive (Giudice & Maggioni, 2014). Continually nurturing, refining, and adapting knowledge creation capability is vital for organizations to leverage emerging opportunities (Teece, 2009).



The SECI model i: individual; g: group; o: organization

Fig. 1.2 The SECI Knowledge Conversion Model (Nonaka & Konon, 1998, p.43; Cheng, 2019a, p.30)

The SECI model analyzes SCT knowledge creation and transfer in schools effectively. It helps us understand how knowledge is created and shared in schools.

Cheng's (2023a) research shows that the SECI model promotes innovation and

creativity in the classroom.

The SECI Knowledge Creation Process, as described in Fig.1.3, sheds light on how individuals, departments and schools construct their professional knowledge and its content and nature. According to Cheng (2019a), the SECI model can be used to analyze the creation and transfer of knowledge in classrooms, departments, and the school environment. The SECI model is widely used to examine the knowledge process and facilitate teacher learning and knowledge building in school contexts (Tee & Lee, 2011; Tammets et al., 2013), making it a suitable analytical tool for this study.

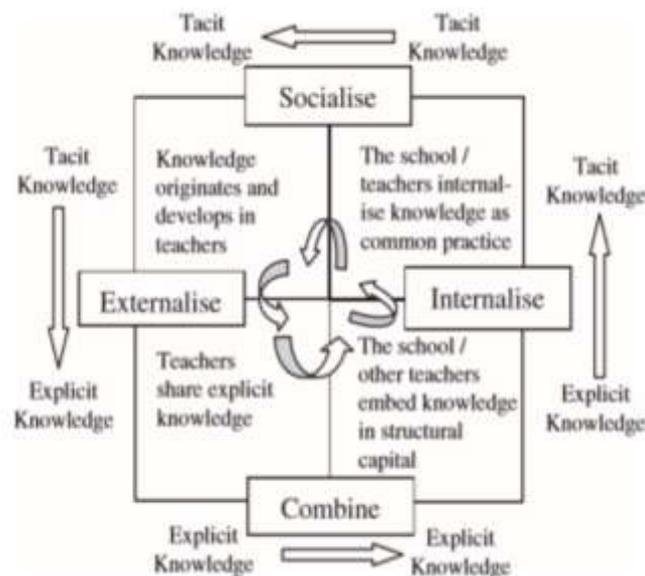


Fig. 1.3 Nonaka's SECI model in the school context (Cheng, 2015a, p.16)

The SECI model is used to analyze how SCT knowledge is created, shared, and used in schools. It highlights the importance of social interaction, tacit knowledge conversion, and explicit knowledge articulation in KM.

Nonaka (1994) offers valuable insights into the knowledge creation process and

the crucial role played by organizational members. Based on Nonaka, the process begins with socialization, which establishes a platform for individuals to share their experiences. Through successive rounds of dialogue, metaphors may be employed to convey hidden tacit knowledge, triggering the externalization mode (Nishihara et al., 2017a). In the combination mode, concepts generated through externalization are merged with pre-existing knowledge, and then be documented. The internalization is initiated through ongoing practices and learning from trial and error. This process enables individuals to acquire knowledge through practical experience, gradually transforming explicit knowledge into tacit knowledge (Nishihara et al., 2017b).

Nonaka et al. (2000b) proposes a knowledge creation model with three components: (i) the SECI process, which converts tacit and explicit knowledge; (ii) *Ba*, the shared context for knowledge creation. The dynamic renewal of knowledge within the organizational context, known as *Ba*, is influenced by the organizational routines responsible for knowledge creation (Nonaka & Reinmoeller, 2017); and (iii) knowledge assets, which are moderators of the knowledge-creating process.

The SECI model examines SCT knowledge dynamics, identifying bottlenecks and gaps in knowledge transfer, leading to better knowledge sharing and pedagogical innovation in SCT. The SECI model is a valuable tool for comprehending knowledge creation and transfer, aiding schools in enhancing KM practices for competitive

advantages.

1.3 Focus and Research Purposes

1.3.1 Problems of primary schools are facing in implementing SCT

Primary schools in HK face challenges in implementing effective SCT due to declining student populations and the threat of school closures. While some teachers support class size reduction, research shows that teachers may not adapt teaching practices in smaller classes, leading to gaps in SCT policy implementation (Galton & Pell, 2012a; Galton et al., 2019).

Galton et al. (2019) indicates that achieving the SCT policy objective of improving the quality of teaching and learning through reduced class sizes requires a paradigm shift in teachers' pedagogy and a significant increase in individualized attention for students. Without these changes, the policy objective may not be realized.

1.3.2 Lack of study on three-tiered knowledge leadership practices that promote KM initiatives for successful SCT implementation

The second research focus is the insufficient understanding of school knowledge leadership practices of principals, middle managers and teachers that promote KM initiatives for successful SCT implementation. Lakshman (2007) finds that leadership is critical in knowledge processes, yet there is minimal empirical investigation into school's three-tiered knowledge leadership's role.

This study aims to examine three-tiered knowledge leadership practices that promote successful SCT implementation. It will investigate the practices and organizational factors involved in the KM process, providing insights to three-tiered knowledge leaders and expanding their understanding of KM implementation.

1.4 Research Questions

The primary research question is, “To what extent does KM, guided by knowledge leadership using Nonaka’s SECI model, improve SCT policy implementation in HK primary school?” Four sub-questions underpin this research question (See Table 1.1).

- (i) What are the leadership practices and organizational factors that enable individual teachers to share their SCT tacit knowledge?
- (ii) What are the leadership practices and organizational factors that facilitate subject teachers to externalize their SCT tacit knowledge into subject-level explicit knowledge?
- (iii) What are the leadership practices and organizational factors that facilitate the combination of group-specific SCT knowledge with school SCT knowledge?
- (iv) What are the leadership practices and organizational factors that enable teachers to internalize the SCT explicit knowledge into their tacit knowledge?

This research examines the roles of three-tiered knowledge leaders in

implementing KM initiatives for SCT in two primary schools. The study addresses four research questions and develops a model illustrating the relationship between three-tiered knowledge leadership practices, KM, and SCT implementation.

1.5 Significance of the Study

The lack of understanding about the significance of tacit knowledge in teaching has profoundly impacted education quality, especially in places like HK. The fast-paced and unpredictable classroom requires teachers to make more daily professional decisions compared to other jobs, highlighting the crucial role of tacit knowledge in SCT. Improving instructional practices and professional knowledge becomes challenging when these aspects are tacit and overlooked in the SECI knowledge creation process. This study in understanding of tacit knowledge is vital, emphasizing the need for educational studies that specifically address these issues.

This study fills the gap in three-tiered knowledge leadership practices and organizational factors for KM implementation in primary schools. The results demonstrate the effectiveness of KM in addressing challenges in SCT implementation. It analyzes the impact of three-tiered knowledge leadership practices and organizational factors on SCT knowledge creation and transfer to determine the influence of KM on successful SCT implementation.

Table 1.1 The linkage among objectives, research questions, background of research, methods, and analysis.

Objectives of the Study	RQs	Methods	
		participants, data collection, etc.	Data Analysis
To identify the leadership practice and school organizational factors that enables knowledge creation to improve school learning and innovation.	To what extent does the use of KM (KM) (using Nonaka's SCEI knowledge creation model as an analytical lens) under the guidance of knowledge leadership enables the better implementation of SCT policy at school level?	1. Interviews: <ul style="list-style-type: none"> ➤ Principals ➤ Middle managers 2. Observation: <ul style="list-style-type: none"> ➤ School's construct of care and team atmosphere⁴ ➤ Staff meetings⁴ ➤ Staff development days⁴ ➤ Learning Circle / CoPs / Professional Learning Communities⁴ ➤ Organizational design: heterarchy Vs. hierarchy ➤ Information sharing and processing system 3. Documents: <ul style="list-style-type: none"> ➤ School annual plans ➤ School annual reports 	Coding systems and categories evolved from interpretation and continuous analysis of data <ol style="list-style-type: none"> 1. Transcription of interviews 2. Process of observation protocol sheets 3. Filing of documents 4. Triangulation on different sources of data
Objective 1. ⁴ To identify the leadership practices and organizational factors ("Ba") those enable the socialization process of SCT knowledge in primary school context.	RQ1. What are the leadership practices and organizational factors that enable the individual teachers to share their SCT tacit knowledge?	1. Interviews: <ul style="list-style-type: none"> ➤ Mentor Teacher ➤ Novice Teacher 2. Observation: <ul style="list-style-type: none"> ➤ Pantry/ Staff rest room ➤ Staff room 3. Documents: <ul style="list-style-type: none"> ➤ School mentoring plans ➤ School mentoring reports 	Coding systems and categories evolved from interpretation and continuous analysis of data <ol style="list-style-type: none"> 1. Transcription of interviews 2. Process of observation protocol sheets 3. Filing of documents 4. Triangulation on different sources of data
Objective 2. To identify the leadership practices and organizational factors ("Ba") those enable the externalization process of SCT knowledge in primary school	RQ2. What are the leadership practices and organizational factors that facilitate subject teachers to externalize their SCT tacit knowledge into subject level explicit knowledge?	1. Interviews: <ul style="list-style-type: none"> ➤ Core subject panels ➤ Core subject panel members 2. Observation: <ul style="list-style-type: none"> ➤ Core subjects panel meetings ➤ Lesson planning meetings ➤ Teaching materials preparation meetings 	Coding systems and categories evolved from interpretation and continuous analysis of data <ol style="list-style-type: none"> 1. Transcription of interviews 2. Process of observation protocol sheets 3. Filing of documents 4. Triangulation on different sources of



context.		<p>3.Documents:</p> <ul style="list-style-type: none"> ➤ Lesson plans ➤ Teaching materials ➤ Panel annual plans of core subjects ➤ Panel annual reports of core subjects 	data
<p>Objective 3.</p> <p>To identify the leadership practices and organizational factors (“Ba”) those enable the combination process of SCT knowledge in primary school context.⁴³</p>	<p>RQ3. What are the leadership practices and organizational factors that facilitate the combination of group-specific SCT knowledge into school SCT knowledge?⁴³</p>	<p>1. Interviews:</p> <ul style="list-style-type: none"> ➤ PSMCD ➤ Core subject panels ➤ IT officer <p>2.Observation:</p> <ul style="list-style-type: none"> ➤ Curriculum & cross curricular meetings ➤ Learning & teaching meetings <p>3.Documents:</p> <ul style="list-style-type: none"> ➤ PSMCD annual plans ➤ PSMCD annual reports ➤ SCT teaching manual ➤ IT annual plans ➤ IT annual reports 	<p>Coding systems and categories evolved from interpretation and continuous analysis of data</p> <ol style="list-style-type: none"> 1.Transcription of interviews 2.Process of observation protocol sheets 3.Filing of documents 4.Triangulation on different sources of data
<p>Objective 4.</p> <p>To identify the leadership practices and organizational factors (“Ba”) those enable the internalization process of SCT knowledge in primary school context.⁴³</p>	<p>RQ4. What are the leadership practices and organizational factors that enable teachers to internalize the SCT explicit knowledge into their tacit knowledge?</p>	<p>3. Interviews:</p> <ul style="list-style-type: none"> ➤ PSMCD ➤ Core subject panels ➤ Panel novice teachers <p>2.Observation:⁴³</p> <ul style="list-style-type: none"> ➤ Pre-lesson preparation ➤ Core subject classroom observation ➤ Post- lesson discussion <p>3.Documents:</p> <ul style="list-style-type: none"> ➤ SCT appraisal form ➤ Learning journal or reflection journal ➤ Subject SCT guidelines ➤ Lesson plans ➤ Teaching materials 	<p>Coding systems and categories evolved from interpretation and continuous analysis of data</p> <ol style="list-style-type: none"> 1.Transcription of interviews 2.Process of observation protocol sheets 3.Filing of documents 4.Triangulation on different sources of data

* Primary School Master/Mistress (Curriculum Development) (PSMCD) serves in public sector primary schools as the curriculum leaders (EDB, 2022f).



1.5.1 Research impact

This study aims to address the research gap by examining three-tiered knowledge leadership practices and organizational factors relevant to KM implementation in primary schools, with a specific focus on principals, middle managers, and teachers. While previous research has explored knowledge leadership practices in secondary schools (Chu, 2013; Hu, 2017, 2019), there is limited research in HK primary school context (Chan, 2022). By using Nonaka's SECI knowledge creation model, this study analyzes tacit and explicit knowledge conversion and creation during SCT implementation in HK. The findings will contribute to filling knowledge gaps, providing recommendations for improving KM practices in schools. The results will inform effective KM strategies and expand on existing study on SCT knowledge creation and transfer processes, with an emphasis on three-tiered knowledge leadership.

1.5.2 Practical impact

This study aims to demonstrate how KM implementation can create and apply knowledge to overcome challenges in SCT implementation in primary schools. Despite the implementation of the SCT policy, there is a research gap in understanding pedagogical changes in SCT (Harfitt et al., 2019). Empirical research is needed to investigate the implementation gap in SCT and the three-tiered knowledge

leadership roles in KM. The study will enhance KM practices in school management and examine the effectiveness of knowledge and pedagogy in adopting Galton's SCT principles. Results will demonstrate how KM measures address challenges in SCT implementation and positively impact school pedagogical initiatives. The study will highlight KM's potential as a strategy for effective SCT implementation and offer guidance to school management.

1.6 Organization of the Thesis

The remaining part of this thesis will follow the following format:

Chapter 2 will review literature on SCT implementation in primary schools, KM in the school context, three-tiered knowledge leadership practices, and the use of the SECI model for SCT knowledge creation and transfer. It will propose a relationship between three-tiered knowledge leadership practices, organizational factors enabling KM initiatives, and SCT implementation in primary schools based on the literature.

This theoretical guide will inform the study.

Chapter 3 of this study will outline the research methodology, including the research methods and cases selected for the study. It will also describe how data will be collected and analyzed.

Chapter 4 will present research findings from each case, supported by data, and synthesize them to provide overall findings. The chapter will discuss these findings in

relation to the literature reviewed in Chapter 2, highlighting their contributions to the current literature. Based on the findings, a model illustrating the relationship between three-tiered knowledge leadership practices, KM, and SCT implementation in primary schools will be developed.

Chapter 5 will provide the conclusion of this study, summarizing the findings and discussing their implications. It will also highlight directions for future studies.

This thesis will offer a comprehensive understanding of how three-tiered knowledge leadership practices and KM relate to successful SCT implementation.

1.7 Chapter Summary

Primary schools in HK face challenges implementing Galton's six SCT principles for quality education. KM is proposed as an effective strategy for overcoming obstacles in SCT implementation. This study examines the impact of three-tiered knowledge leadership and KM for successful SCT implementation. Effective knowledge leadership practices are crucial, with school leaders (principals, middle managers, and teachers) playing a critical role. However, there is no research on three-tiered knowledge leadership practices specifically for KM and SCT implementation. This study aims to fill this gap by investigating three-tiered knowledge leadership practices, promoting KM initiatives, and contributing to academic understanding in this area.

CHAPTER 2 LITERATURE REVIEW

This chapter reviews literature supporting the study's objectives. Managing a school's intangible knowledge resources is crucial due to declining student populations, smaller class sizes, and educational reform challenges. Implementing KM initiatives is valuable for facilitating SCT knowledge creation, transfer, and external knowledge flow in SCT implementation. This study uses Nonaka's SECI model to analyze tacit and explicit knowledge conversion in SCT implementation in HK primary schools, filling knowledge gaps.

KM effectively supports SCT implementation in primary schools by acquiring, storing, sharing, applying, and creating SCT knowledge assets and competences. Primary schools should adopt KM practices to ensure successful SCT implementation. Two strategies, personalization and codification, have been developed in the literature (Zhao, 2010; Chu, 2013; Cheng & Lee, 2016; Cheng et al., 2017; Hu, 2019; Cheng, 2019a, 2019b) for KM implementation in HK schools. This study conceptualizes KM implementation strategies and examines their influence on SCT implementation in primary schools with three-tiered knowledge leadership.

Effective school leadership is crucial for KM implementation. This study aims to identify three-tiered knowledge leadership practices for principals, middle managers, and teachers in KM implementation. These practices include setting a KM-focused school vision, being a role model, promoting teachers' continuous learning and

professional development in KM, fostering a knowledge-sharing culture, establishing high collegial-trust, utilizing information and communication technology (ICT), and seeking support from partners. The study investigates the impact of three-tiered leadership practices on KM implementation in primary schools.

The study aims to investigate the effects of three-tiered knowledge leadership practices and organizational factors on KM implementation and teachers' knowledge creation and sharing behaviors in the SCT framework.

2.1 SCT in HK primary school context and the challenges encountered

Former-Chief Executive Donald Tsang introduced SCT in HK's public sector primary schools in 2009-10. Implementation expanded gradually, requiring schools and teachers to find innovative ways for maximum benefits and quality education. The shrinking student population poses challenges (EDB, 2022a), including class reduction and potential closures, pressuring schools to improve SCT implementation and optimize education quality. The government aims for over 90% of public sector primary schools to have SCT by 2025-26 (HKSAR, 2022), with some schools already implementing it and more expected to follow in the coming years (EDB, 2023b).

The notion that “small is good, big is bad” simplifies the class size issue (Blatchford, 2015). However, SCT provides practical options for effective teaching (Blatchford & Bassett, 2003). The OECD Yearbook 2015 states that top education

systems prioritize teacher quality and argue that effective teaching and teacher-student relationships matter more than class size alone (Schleicher, 2015). However, it's not a simple choice between class sizes or teaching quality; both are vital. SCT offers a golden opportunity for schools to enhance teaching quality by adopting KM.

However, there are challenges in SCT implementation in schools (Harfitt, 2012). Teachers may prefer smaller class sizes but often fail to fully leverage SCT due to a lack of PCK for smaller classes (Galton & Pell, 2009). This may be due to a lack of professional knowledge and understanding of teaching reduced-size classes. Teachers need solid theoretical understanding, SCT PCK, and skills in lesson preparation, questioning techniques, student engagement, collaborative learning, assessment design, and feedback utilization to optimize SCT's potential (Galton et al., 2015).

Heavy workloads and job dissatisfaction are common in HK's education field due to workload concerns (Choi & Tang, 2011; Pow & Wong, 2017), and workplace factors affect SCT implementation (Pow & Wong, 2017). These factors also hinder effective SCT implementation in HK.

2.1.1 SCT and School Development

Three-tiered knowledge leadership in KM can aid schools in acquiring, sharing, creating, transferring, applying, and storing SCT PCK, promoting effective SCT implementation within the local culture and context. SCT enables favorable

conditions for quality teaching and improved education quality for teachers (Blatchford, 2015). Successful SCT implementation is anticipated to enhance teaching effectiveness, student learning outcomes, and foster a more equitable education system (Tang, 2021, 2022).

This study examines KM implementation and the roles of principals, middle managers, and teachers as knowledge leaders in facilitating SCT knowledge creation and transfer. It assesses their influence on SCT implementation in two primary schools and explores the KM initiatives undertaken by the schools. The study investigates teachers' perceptions and the current KM status in the schools, providing valuable insights for effective KM implementation.

2.1.2 Galton's Theory of SCT

The "Report on the Study on Small Class Teaching" highlights Galton's six SCT pedagogic principles for effective SCT implementation. Galton & Pell (2009) emphasize that these principles guide teachers in acquiring, sharing, creating, transferring, applying, and storing SCT PCK and skills while reflecting on classroom practices. KM initiatives support effective SCT implementation by enhancing the effectiveness of smaller classes. Galton's six SCT principles aim to guide classroom improvements, optimize SCT benefits, and enhance teaching and learning effectiveness (Galton, 2010b).

According to Wong & Pow (2012), the Galton's six SCT principles of are:

- (i) Clear statement of learning objectives,
- (ii) Extended questioning during whole-class discussions,
- (iii) More active pupil participation,
- (iv) Increased cooperation between pupils through working in pairs and groups,
- (v) Less use of corrective feedback and more use of informing feedback, and
- (vi) More use of the assessment for learning (AfL) approach.

The six key principles offer a framework for effective SCT pedagogies, but they shouldn't be seen as strict rules (Galton, 2010c). Teachers need to adapt their pedagogies to students' needs and classroom context. By using these principles as a guide, teachers can create an environment that maximizes SCT benefits and enhances the teaching and learning experience.

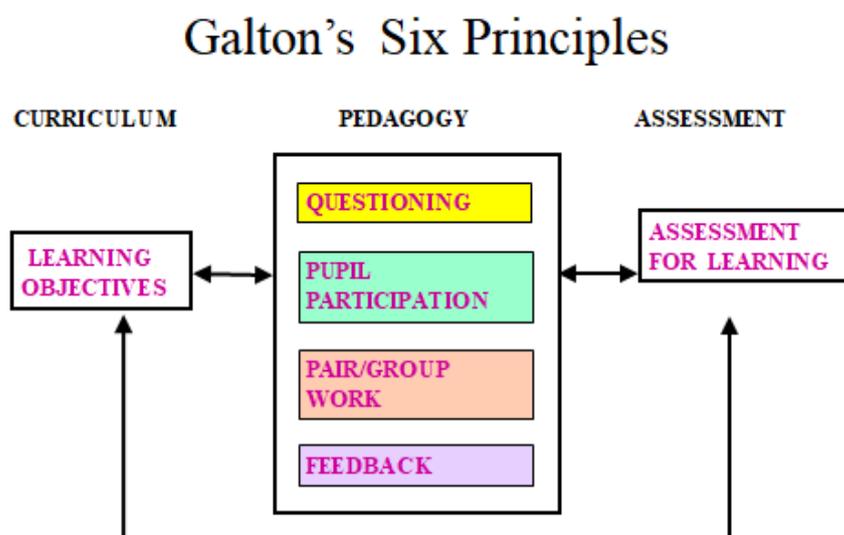


Fig. 2.1 SCT Six Key Principles suggested by Galton (2010c)

Galton (2010c) recommends six key principles for effective SCT (See Fig. 2.1), which the EDB renamed the “six core principles” for classroom practice (EDB, 2010a). Professional development programs (PDPs) include Learning Circles to promote collaborative lesson planning based on the recommendations of Galton & Pell’s (2009) report (EDB, 2010b).

The EDB sees SCT as vital for improving student learning through smaller classes (EDB, 2023b). To boost SCT, primary schools can use KM to integrate self-regulated learning in classrooms (Cheng, 2015a; Cheng et al., 2017). This study explores the link between three-tiered knowledge leadership, effective SCT implementation, and KM development. The findings will contribute to existing literature on school knowledge leadership in KM and SCT implementation.

2.1.3 Section summary

Schools can use KM systems to develop SCT PCK and support teachers in adopting a student-centered approach. The EDB emphasizes the importance of small class settings for promoting teaching for understanding. KM and three-tiered knowledge leadership practices can address these challenges and facilitate successful SCT implementation. Teachers should acquire SCT PCK and skills. KM enables schools to establish structures and mechanisms for acquiring, applying, sharing, retaining, and creating SCT knowledge, improving teaching and learning.

2.2 Teacher learning in HK context

The field of education is currently experiencing rapid economic, social, political, and technological transformations. Teacher learning is needed in the HK context for SCT pedagogical change in a climate of population decline and consequent falling school rolls. HK schools need to be adaptable to respond to changing situations and contexts. Additionally, the classroom environment is also characterized by its fast-paced, complex, and unpredictable nature, requiring teachers to make numerous professional decisions daily. Consequently, SCT tacit knowledge plays a more significant role in the professional knowledge required for teaching compared to other occupations in HK. The challenge lies in improving SCT practices and professional knowledge that are tacit and often go unnoticed.

The definition of tacit knowledge refers to knowledge that remains within an individual's mind, being highly personal (Chen et al.,2018; Holford,2018; Khoshorour & Gilaninia,2018; Perez-Fuillerat et al., 2018; Agyemang & Boateng,2019; Asbari, 2019; Zebal, Ferdous & Chambers, 2019). The transformation of SCT tacit knowledge necessitates teachers' personal interactions, as highlighted by Lee (2019). SCT tacit knowledge in nature is deeply rooted in one's actions, experiences, ideals, values, and emotions (Boske & Osanloo,2015; Kawamura,2016; Hartley,2018; Asbari, 2019). It is categorized as personal knowledge, acquired from individuals (Dudley, 2013; Jaleel &

Verghis,2015; Munoz et al.,2015; Nonaka & Toyama, 2015; Jou et al.,2016; Razmerita et al.,2016; Wang et al.,2016; Serna et al.,2017; Stewart et al.,2017; Rothberg & Erickson, 2017). The experiences gained by each teacher vary significantly based on unpredictable situations and conditions. SCT Tacit knowledge is not easily expressed or converted into explicit knowledge (Zhang et al.,2015; Addis , 2016; Mohajan,2016; Prasarnphanich et al.,2016; Cairo Battistutti, 2017; Spraggon & Bodolica, 2017; Liu, 2019). Unfortunately, the current understanding of SCT tacit knowledge in teaching is limited, highlighting the urgent need for research studies that address these issues in the field of HK education. This underscores the importance of conducting studies on teacher learning.

To Liu (2019), research conducted on teacher professional development in recent decades has identified various approaches to facilitate the process of teacher learning. One widely recognized and effective approach is the professional CoP model, although it is not without criticisms (Grossman, Wineburg, & Woolworth, 2001; Little, 2002, 2003, 2012; Watson, 2014; Harris, Jones, & Huffman, 2017; Liu, 2019). Little (2002) pointed out that while research has acknowledged the role of professional communities in teacher development and school improvement, there is limited understanding of how teacher learning is facilitated within these communities, particularly from a micro-perspective. Little's concern led to over a decade of inquiry

into teacher learning through the lens of workplace interactions (Hurd & Lewis, 2011; Dudley, 2013; Liu, 2013; Horn & Kane, 2015; Horn et al., 2017; Liu, 2019).

Similarly, recent research focusing on LS has also emphasized the significance of interaction within a professional community as the primary driver of teacher learning (Dudley, 2013; Warwick et al., 2016; Liu, 2019; Cheng, 2023a). Building upon this body of work, this study employs a cross-case methodology utilizing the SECI model as an analytical lens to examine teacher professional learning in an SCT learning circle with PDCA cycles within a professional community. It explores the dynamic relationship between teacher learning, professional dialogue, teacher interactions, SCT knowledge sharing, and shared classroom practice.

Friedrich & McLaughlin (2001) argued that teacher learning primarily consists of tacit knowledge, which is challenging to articulate and share. Within teacher professional development organizations, knowledge is generated as staff members observe and engage in each other's work over time and in various settings. Acquiring direct exposure to colleagues' practices plays a crucial role in knowledge generation, as professional development beliefs and methods largely rely on tacit knowledge. Staff engage in informal interactions within the same environment, they develop a profound understanding of their working contexts. Through active involvement in each other's work, staff acquire both tacit and explicit knowledge about one another's

practices. These interactions form ongoing processes that accumulate and deepen knowledge over time.

In Chan-Yip's (2004) study, she observed how HK secondary school teachers engaged in a cyclical process (plan-act-observe-reflect) of problematizing and reconstructing their habitual teaching practices. Chan-Yip (2004) emphasized the significance of teachers' tacit knowledge in practice and suggested that experienced teachers needed to assist novice teachers in sharing their tacit knowledge, thereby enriching their knowledge base for professional development.

According to Ying (2010), *Teachers and Teacher Educators in Action Learning in China* as a platform, allows teachers and teacher educators to express their tacit knowledge explicitly, fostering continuous professional growth and self-empowerment within a period of educational reform and accountability.

Dudley (2013) conducted research to investigate the nature and outcomes of teacher learning within the context of LS. LS, as described by Dudley (2013), is a teacher learning process that originated in Japan in the 1870s (Sato, 2008), expanded to China in the 1950s (Chen, 2011), and has since spread to the Asia Pacific region since the 1990s (Lee, 2011), as well as the United States, Canada, Europe, Africa, and the Middle East (Dudley, 2012; Shimizu & Takuya, 2012). Dudley's (2013) research is the first to employ discourse analysis at the interaction level to examine teacher talk

in LS and uncover patterns and modes of teacher learning. According to Dudley (2013), LS involves a group of teachers aiming to enhance various aspects of student learning, ranging from underperforming student groups to curriculum areas that teachers believe could be taught more effectively. Collaborative LS processes, as identified by Dudley (2013), facilitate teachers' access to tacit knowledge resources and help them remove filters developed to navigate the complexities of the classroom, thereby revealing hidden characteristics of students. This process both challenges and informs teacher beliefs, leading to the joint development of improved instructional practices.

In Dudley's (2013) study, it was demonstrated how deliberate and collaborative processes in LS enable teachers to access and apply tacit knowledge that would otherwise remain hidden. These processes also help teachers to deactivate filters that have obstructed important aspects of daily classroom information since the early stages of their careers. As a result, teachers have enhanced their capacity to observe and evaluate the needs and motivations of their students. The primary driving force for the teachers involved in LS was the strong motivation to enhance their students' learning experience.

According to Dudley (2013), teacher communication within the context of LS provides teachers with an opportunity to tap into their tacit knowledge reserves. This

form of communication also holds teachers responsible for the intricate aspects of classroom interaction, practice, and knowledge that have a substantial impact on their capacity to enhance their students' learning.

In a study conducted by Brevik (2014), the findings highlighted the significance of activating tacit knowledge for effective teacher professional development. The study demonstrated how teachers' learning progressed over time, with tacit practices being made explicit through written narratives and an enhanced metacognitive awareness. Both Avalos (2011) and Brevik (2014) found that teacher reflection was a successful tool for transforming instructional practices.

Liu's (2019) research showcases how teachers' tacit knowledge was dispersed among various members of the professional community, each with their own pedagogical viewpoints. Through micro-analysis, Liu illustrates how teachers' conversations fostered a dialogic environment, enabling participants to express and utilize their tacit knowledge during negotiations. The study's findings emphasize the significance of promoting teacher collaboration and dialogue as essential components of professional development. Based on the interview data collected in Liu's (2019) comprehensive project, it is evident that all the participating teachers highly appreciate the significance of workplace interaction in their professional development and continuous teacher learning.

According to Asbari et al. (2019), a novel model is proposed to develop teacher innovation capability through the combined utilization of tacit and explicit knowledge sharing, with organizational learning serving as a mediating factor. Asbari et al. (2019) argue that the sharing of knowledge, encompassing both tacit and explicit forms, has the potential to greatly enhance school performance.

Concerning the knowledge leadership in leading teacher learning, the followings are identified in the literature. To Dudley (2013), a meta-analysis conducted by Robinson, Hohepa, & Lloyd (2009) revealed that the most impactful intervention a school leader can undertake to enhance academic achievement is to actively engage in school-based, improvement-focused, and inquiry-led professional learning.

Based on Asbari et al. (2019), school leaders should establish an environment that fosters autonomy and encourages teachers to share and create knowledge. It is vital for knowledge leaders to create enabling conditions that promote the engagement of teacher learning in the process of knowledge creation within the school.

According to Liu (2019), the key to achieving success in educational reform lies in establishing avenues for teacher collaboration and professional dialogue, enabling the externalization and mobilization of distributed tacit knowledge. This process facilitates teacher learning and contributes to their professional development. Liu (2019) also argues that school leaders and middle managers need to recognize that

professional communities, particularly teacher collaborative activities, should not be employed as administrative measures to enforce agreement and rapid change. Rather, they should serve as mediating tools to enhance teachers' awareness of divergent perspectives in their thinking and practices. Additionally, these activities should enable mutual learning, enriching teachers' repertoires for learning.

For schools to remain competitive and adaptable, it is essential to empower teachers in the process of enhancing school performance. This transformation necessitates the evolution of schools into learning organizations, facilitated by continuous teacher learning. By empowering teachers, organizational learning becomes a driving force behind school improvement and transformation. According to Asbari et al. (2019), the productive and sustainable assets primarily consist of intangible assets, specifically the knowledge embedded within teachers. The knowledge possessed by individual teachers becomes IC, serving as school assets.

To Asbari et al. (2019), it is crucial to foster extensive participation of all teachers in facilitating the knowledge sharing, including both tacit and explicit knowledge. The SECI model can be utilized as a framework to facilitate this knowledge creation process. The SECI Model has been identified to empower tacit knowledge (Lievre & Tang, 2015; Huang et al., 2016; Norwich et al., 2016; Stanica & Peydro, 2016; Hodgins & Dadich, 2017; Okuyama, 2017; Sasaki, 2017; Baldé et al.,

2018; Chatterjee et al., 2018; Li, Liu & Zhou, 2018; Nonaka & Hirose, 2018; Cheng, 2023a). Knowledge creating school should make effective use of teachers' tacit knowledge by promoting knowledge sharing and teacher learning. To manage and utilize tacit knowledge, which resides in the subconscious mind of each teacher beyond their conscious awareness, schools can adopt SECI model that emphasizes embedding and sharing (Cantwell & Zaman, 2018; Ferraris et al., 2018; Ferreira et al., 2018; Guo et al., 2018; Ma et al., 2018; Borges et al., 2019; Tsai & Hsu, 2019; Swierczek, 2019; Cheng, 2023a).

To foster a culture of learning, school knowledge leaders play a vital role in facilitating teacher engagement and interaction within the learning process. This enables the effective transfer, sharing, and combination of both existing and newly acquired knowledge among teachers, thereby contributing to the development of school intelligence and knowledge (Chang & Lin, 2015; Lee et al., 2016; Lin & Lee, 2017; Cheng, 2023a).

Shulman (1986, 1987) argued that the professionalization of teaching hinges upon the nature, substance, and origins of teachers' knowledge. He emphasized the challenge teachers face in articulating their tacit knowledge and proposed that developing an awareness of the concepts employed in their instruction could assist teachers in explicitly describing their tacit knowledge. This is why this study suggests

that a learning circle based on the SCT and utilizing the Plan-Do-Check-Act (PDCA) cycles, which operate under the SECI model, can serve as a form of professional dialogue, exchange, and personal classroom lesson practices with teachers' mutual support. This approach can assist novice teachers in activating, sharing, and externalizing their tacit knowledge among teachers at the departmental level, and eventually internalizing their explicit SCT knowledge into personal tacit knowledge.

2.3 Nonaka's Theory

2.3.1 The Nonaka & Takeuchi KM Model

The theory of organizational knowledge creation, initially developed by Nonaka and his colleagues, stemmed from their studies on information creation in innovative companies (Nonaka, 1988, 1991). Nonaka & Takeuchi's theory attributes the success of Japanese companies to their effective utilization of skills and expertise in knowledge creation for innovation in their book "Knowledge-Creating Company". They establish a KM system that supports continuous knowledge renewal.

The theory was initially presented as a two-dimensional framework, consisting of the "epistemological" and "ontological" dimensions (Nonaka 1994: 16-17; Nonaka & Takeuchi 1995: 57-60). However, Gourlay (2006) suggests that the theory has evolved to include three elements or levels, replacing the "ontological" dimension with "*ba*" and "knowledge assets" (Nonaka et. al. 2001b: 16). While the SECI processes

continue to play a significant role, these new elements have been incorporated into the theory (Nonaka et. al. 2000; 2001a; 2001b).

The Nonaka & Takeuchi KM model focuses on transforming tacit knowledge into explicit knowledge within the market and organization, leading to the development of innovative products. It also involves re-conceptualizing organizational design and strategies through the lens of knowledge creation.

It is important to note, however, that KM is originally a business concept, which needs to be adapted and adopted within the education sector rather than directly transplanted. As educators, it is crucial for us to recognize the impact of market privatization on school education, and Sweden serves as a prime example of system failure in this regard. Lotta Edholm, the Minister of Schools in Sweden, has publicly acknowledged the country's "system failure" in relation to its free schools. She has announced a significant overhaul, which would be the most extensive in three decades, and has raised concerns about a model where profit-oriented companies are responsible for running state education (Bryant, 2023). However, it is worth noting that KM is centered around organizational learning. Since schools are also organizations, KM can be adapted, adopted, and applied within the school setting, aligning with this perspective.

Cheng (2015a) highlights the widespread application of Nonaka & Takeuchi's

KM model in educational organizations. The SECI model, based on dialectic epistemology, describes the mutual transformation of tacit and explicit knowledge. Nonaka & Takeuchi's four modes of knowledge conversion (socialization, externalization, combination, and internalization) create a dynamic process for organizational knowledge creation

KM enhances decision-making and problem-solving at different levels, including classroom-level SCT pedagogical strategies, departmental, and school-wide levels. Furthermore, KM supports the creation of IC to implement SCT school policies.

Socialization creates shared tacit knowledge through collective experiences. Externalization transforms tacit knowledge into explicit knowledge, often using concepts and diagrams. Combination integrates new and existing explicit knowledge into systemic knowledge. Internalization involves internalizing explicit knowledge, embodying it as tacit knowledge and PCK, and possessing the practical “know-how” to teach.

2.3.2 Nonaka Knowledge Creation Theory

Nonaka & Takeuchi's (1995) knowledge creation theory, mentioned by Hislop (2013), holds significant influence in KM. This theory presents the SECI knowledge creation model, which elucidates the transformation between tacit and explicit knowledge. This transformation drives innovation and learning at individual, group,

and organizational levels. The SECI model depicts knowledge creation as a dynamic process, where organizations continually generate, maintain, and leverage knowledge.

To grasp knowledge conversion and creation, the connection between ontological and epistemological dimensions is crucial. Nonaka & Takeuchi (1995) introduce the SECI model, depicting the transformation between tacit and explicit knowledge. This model spans various ontological levels, encompassing individuals, groups, organizations, and more. Nonaka & Takeuchi (1995) suggest that the spiral of knowledge emerges from the dynamic interaction between tacit and explicit knowledge, influencing and transforming creative endeavors. The SECI model consists of four knowledge conversion processes: socialization, externalization, combination, and internalization.

Socialization transfers tacit knowledge among teachers, involving knowledge collection and construction within a social context. Knowledge acquisition through socialization can happen formally through education or informally through interactions with other teachers (Capel, 2007).

Externalization transforms tacit knowledge into explicit knowledge through recorded dialogues, allowing for codification into a development plan. It involves articulating tacit knowledge into explicit concepts, analogies, hypotheses, or models (Nonaka & Takeuchi, 1995). Language and visual representation convert individual

teachers' tacit knowledge into explicit knowledge, which can be further developed into PCK for a group or entire school. Externalization brings clarity to ideas and fosters new insights. However, successful transfer of an individual teacher's tacit knowledge to the collective knowledge depends on the individual experiences and situations within *Ba*.

Combination converts explicit knowledge at the group level into practical organizational knowledge for the school's benefit. This process is vital for organizational development. Knowledge combination is a purposeful design process that transforms concepts into specific knowledge through analysis. Nonaka & Takeuchi (1995) define combination as the systematic integration of knowledge into an organizational knowledge system, treating it as a valuable asset. Teachers exchange and combine knowledge through various means like documents, meetings, calls, or IT-based communication. Adding, combining, and categorizing explicit knowledge (e.g., in databases) can foster the emergence of new knowledge.

Internalization is when individual teachers actively practice and assimilate collective explicit knowledge, transforming it into their tacit knowledge. It is not a passive absorption but a subjective and conscious construction process. Internalization involves learning by doing, where teachers acquire organizational explicit knowledge through professional practices (Nonaka & Takeuchi, 1995). The knowledge assets

gained from socialization, externalization, and combination processes become valuable when internalized as teachers' tacit knowledge.

2.3.3 How to operate SECI Mechanism for Knowledge Creation

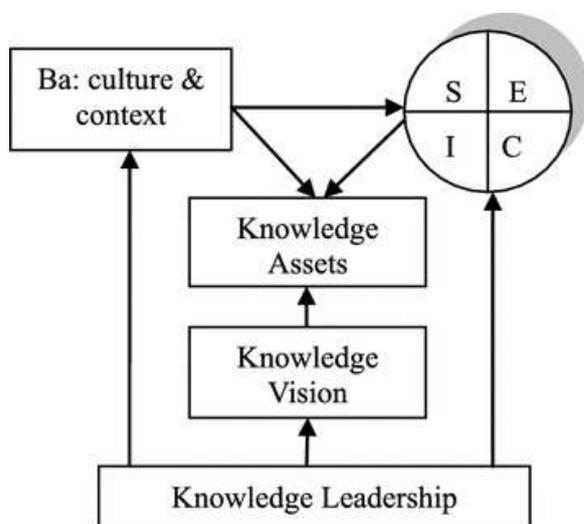


Fig. 2.2 Operating SECI mechanisms for Knowledge Creation (Cheng, 2019a, p36)

Cheng (2019c) finds a research gap on SECI mechanism institutionalization in schools. This study aims to fill the gap and offer insights to education. Effective knowledge asset creation and management are vital for a school's competitive advantage. Nonaka et al. (2000a) propose a model (Fig. 2.2) with four core elements: knowledge leadership, assets, *Ba*, and SECI mechanism.

In the SECI knowledge creation model, knowledge leadership (See section 2.5) is vital for driving the process (Cheng, 2019c). Knowledge leaders establish and nurture *Ba*, the shared context for knowledge creation (Cheng, 2019a). *Ba* includes the school's culture, policies, and practices for knowledge sharing, fostering collaboration among teachers and subject panels to apply, create, and transfer

knowledge through the SECI process.

Cheng (2019a) states that knowledge leaders guide and promote the SECI knowledge creation process to manage the school's knowledge assets for sustainable development. These assets, generated within the SECI mechanism, result from converting tacit and explicit knowledge. They include skilled teachers, competencies, policies, structures, collaborative culture, and positive stakeholder relationships (Cheng, 2019a).

Tacit knowledge refers to knowledge that is challenging to express explicitly and is closely associated with practical skills and expertise. PCK, as highlighted by Shulman (1986, 1987), necessitates teachers to possess both the knowledge of what to teach and the knowledge of how to teach. Shulman (1987) put forth the notion that the knowledge crucial for successful teaching is PCK. The lack of improvement in the quality and shared teaching practices related to PCK among teachers is detrimental to students, teachers, and the school. According to a study by Alimuddin et al. (2021), PCK plays a significant role in influencing the effectiveness of the teaching and learning process within the classroom. The levels of PCK among teachers in a particular school can vary based on their individual background knowledge and experience. It is imperative to address this gap and ensure that every teacher experience professional growth. PCK is a type of knowledge that evolves as teachers

accumulate knowledge and experience in their teaching profession. In a school setting, teachers serve as the practitioners of teaching and exhibit varying levels of PCK (Chan & Yung, 2018).

There is an alternative solution to this issue by exploring the field of KM. The SECI and *Ba* approaches proposed by Nonaka & Takeuchi, which aim to make tacit knowledge, typically unconscious, visible, retrievable, and combinable with conscious or propositional knowledge at three organizational levels have been examined. These approaches shed light on how to enhance what Schulman (1986) refers to as teachers' PCK, and what Aristotle terms as teachers' phonetic or craft knowledge, thereby improving teaching practices and student learning. This knowledge can be mobilized across the entire school. Knowledge creation through SECI model offers a fresh perspective on knowledge acquisition and can be integrated into the field of education.

Alimuddin et al. (2021) propose to enhance teachers' PCK through the knowledge creation approach. They employ the SECI model to develop a systematic procedure that enables teachers within the same school to collaborate and exchange PCK, thereby facilitating the externalization, combination, and internalization of each other's PCK into their own teaching practices. The studies conducted by Alimuddin et al. (2021) and Cheng (2023a) demonstrate the effectiveness of utilizing knowledge creation, particularly through the SECI model, in enhancing teachers' PCK. The SECI

process employed in their study enables teachers to collectively develop a shared understanding of PCK, enhance their own PCK, and bridge the knowledge gaps that exist among them. The findings of their study revealed a significant improvement in teachers' PCK through the implementation of the SECI model.

The theory suggests that through the knowledge creation process, both teachers and the school can grow together through the knowledge creation process (Nonaka et al., 2000b).

2.3.3.1 School Knowledge Assets for operating SECI Mechanism

Cheng (2019c) identifies knowledge assets in schools: teachers' competencies, policies, structures, manuals, positive sharing culture, collaborative work, and parent partnerships. These assets result from converting tacit and explicit knowledge in the SECI mechanism. Leveraging them drives innovation and improves education quality. Cultivating a collaborative culture ensures continuous growth, keeping schools at the forefront of educational innovation and best practices.

2.3.3.2 Cultivating Ba for Knowledge Sharing

Nonaka's theory highlights context's importance in knowledge creation (Nonaka et al., 2000). Teachers engage in knowledge activities within the contextual environment called *Ba* (See Fig. 2.3). *Ba* is a shared space where relationships converge.

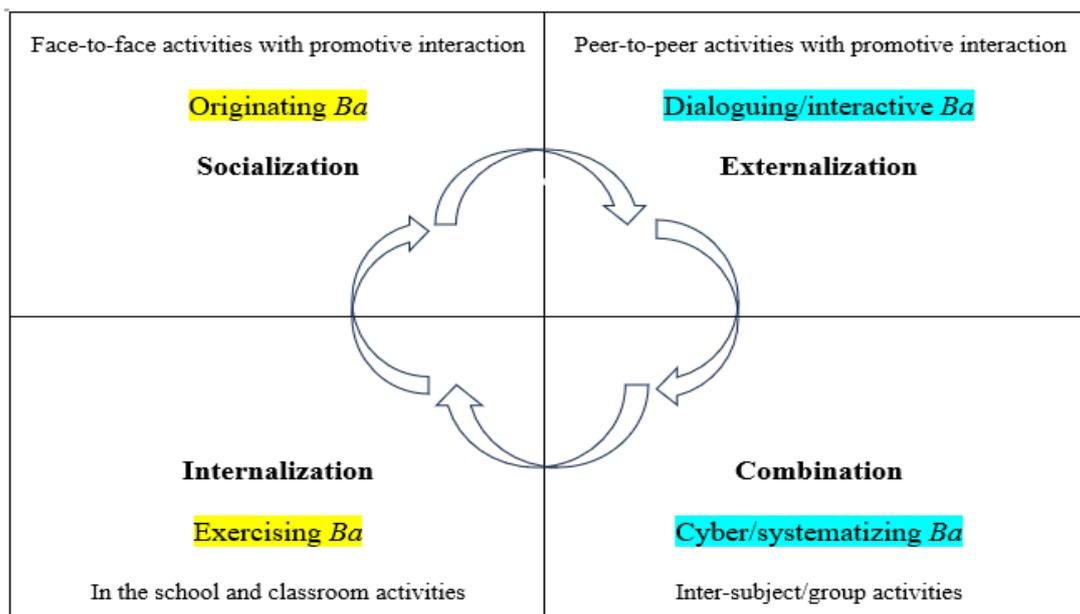


Fig. 2.3 Four characteristics of *Ba* (Cheng,2019a, p39)

Nonaka et al. (2000a) identify four types of *Ba* based on the dimensions of virtual/face-to-face and collective/individual. These types are as follows:

(i) *Originating Ba*: Face-to-face interaction among individual teachers where emotions, feelings, and mental models are exchanged. This type of *Ba* is characterized by shared care, commitment, friendship, love, and trust.

(ii) *Dialoguing Ba*: Face-to-face interactions among teachers in a collective setting where individual mental models are exchanged and expressed through verbal communication.

(iii) *Systemizing Ba*: Virtual interactions among teachers in a collective manner where explicit written knowledge is exchanged and shared among a large group of teachers.

(iv) *Exercising Ba*: Virtual interactions among individual teachers where explicit written knowledge is concretized and applied through virtual means.

Understanding and utilizing these types of *Ba* enables teachers to effectively create and transfer knowledge, resulting in improved teaching practices and better student outcomes.

2.3.3.3 Collaborative Lesson Preparation in SECI model as a path toward Knowledge

Sharing

Cheng & Lee (2020) acknowledge that HK schools employ collaborative lesson preparation and peer-lesson observation for professional development. However, considering these practices as “usual” diminishes their effectiveness. To enhance effectiveness, Fok (2016) proposes improving rationales and cultivating a collaborative culture. Cheng & Lee (2020) recommend utilizing LS, akin to the Learning Circle approach, to foster a collaborative culture in lesson preparation and observation. Xu (2015) stresses the significance of collaborative lesson preparation with experienced teachers for novices, highlighting the importance of pedagogical learning and mutual trust.

2.3.3.4 Learning Circle in SECI model as a path toward Knowledge Creation

Elliott et al. (2011) assert that skilled interpersonal relations play a vital role in effective teaching and learning. However, most professional knowledge in this domain is tacit and therefore challenging to convey. Zheyu et al. (2021) also contend that tacit knowledge plays a crucial role in fostering students’ learning ability,

particularly in comprehending and resolving problems. Nevertheless, the current understanding of tacit knowledge in education is inadequate, underscoring the greater need for research in this area compared to other professions. The transformation of tacit knowledge presents a formidable challenge. Collins (2001) asserts that tacit knowledge is integral to initiating problem discovery and enhancing contextual understanding. The SECI model, introduced by Nonaka & Takeuchi (1995) is widely accepted in the field of education, the SECI approach elucidates the process of knowledge transfer and transformation, enabling teachers and students to construct, update, and apply knowledge intentionally and explicitly (Xue et al., 2020). The research conducted by Zheyu et al. (2021) contributes theoretically to teaching strategies regarding tacit knowledge and provides practical assistance to teachers in organizing instructional activities accordingly. According to Sternberg (Sternberg et al., 2000; Sternberg & Hedlund, 2002), tacit knowledge, although connected to experience, relies more on the ability to learn from that experience. It is believed that learning circles, lesson studies, mentoring and coaching approaches can enhance teachers' learning experience in tacit knowledge through teaching-specific use of SECI KM model.

Sin (2011) introduces Learning Circle as an unconventional way to improve teaching practice in special schools, where teachers became learners, leaders, and

collaborators. This approach successfully inspires teachers to examine how their teaching practices support student learning. Cheng (2019a) identifies three knowledge types essential for professional learning communities: subject matter and teaching/learning, interpersonal relationships between teachers, and teachers' personal qualities. Practical SCT knowledge helps teachers create suitable learning activities for students.

The Learning Circle and LS serve as models for teacher collaboration, professional learning communities, and knowledge creation platforms (Cheng, 2019a). Through reflection and professional dialogue within the Learning Circle, teachers can integrate their SCT knowledge and enhance their PCK. Leavy & Hourigan (2016) discovered that classroom teaching reflection promotes growth in knowledge subdomains and leads to robust, transferable PCK. Cheng (2019a) observes that codifying tacit knowledge into teaching materials removes explicit knowledge from its original context, including learners, teachers, and the school-based curriculum. LS produces contextualized knowledge within case reports, which can be disseminated more easily as part of the school's shared inventory (Cheng, 2019a).

2.3.4 Section summary

The SECI model is a well-known framework for knowledge creation in organizations, but academic studies have overlooked empirical support for it. This

study aims to enhance understanding of how the SECI mechanism creates SCT knowledge in schools. Schools are expected to create and use SCT PCK, creating sustainable competitive advantages as knowledge-creating entities. The Learning Circle significantly contributes to creating SCT PCK for interactive teaching and active learning in SCT classrooms.

2.4 Knowledge & KM

2.4.1 The Concept of Knowledge and its Importance for School as an Organization

Knowledge is vital for organizational sustainability (Cheng, 2015a). Various definitions of knowledge exist: a blend of facts, skills, and experiential information (Awad & Ghaziri, 2004); information derived from experiments, experiences, comments, or ideas (Kazak, 2021); and information in use or valuable information ready for application (Sallis & Jones, 2002; Aktan & Vural, 2016).

Distinguishing data, information, knowledge, and wisdom is crucial (Cheng, 2015a). While they are often mistaken (Surbakti, 2015; Kazak, 2021), they can be defined as raw facts, structured and meaningful data, and refined and valuable data for decision-making and problem-solving (Surbakti, 2015).

Knowledge sharing is vital in schools for applying information and tackling future challenges (Kazak, 2021). There are two types of knowledge: explicit and tacit. Explicit knowledge is objective and tangible, conveyed through verbal and written

information, whereas tacit knowledge is personal, context-specific, and difficult to express (Nonaka & Takeuchi, 1995; Sallis & Jones, 2002).

Tacit knowledge resides within teachers' experiences, skills, and perceptions and can be transformed into explicit knowledge through processes like LS (Cheng, 2015a, 2019a, 2023a). Explicit knowledge is well-organized and transferable among teachers and subject-panels (Cheng, 2019a).

Table 2.1 Differences between the Tacit and Explicit Knowledge

Tacit Knowledge↵	Explicit Knowledge↵
Inexpressible in a codifiable form↵	Codifiable↵
Subjective↵	Objective↵
Personal↵	Impersonal↵
Context Specific↵	Context independent↵
Difficult to share↵	Easy to share↵

(Adopted from Chu, 2013: p.11 and Hu, 2019: p.32)

Chu (2013) and Hu (2019) conduct a comparison between explicit and tacit knowledge and summarized their differences in Table 2.1.

Two strategies, personalization and codification, have emerged to manage tacit and explicit knowledge. The upcoming section (2.4.3) will delve into these strategies.

2.4.2 KM, its Purpose and Benefits for HK Schools

This section explains KM and emphasizes its importance in schools. KM is a strategic management discipline that leverages information and knowledge to enhance organizational performance (Davenport & Prusak, 1998). Although commonly linked to commercial organizations, KM can also benefit schools by improving teacher

competence and maximizing knowledge utilization (Chu, 2013; Hu, 2019; Cheng, 2019a; Kazak, 2021; Chan, 2022). In schools, KM entails retrieving, sharing, applying, storing, and creating knowledge to optimize its utilization (Cheng, 2019a).



Fig. 2.4 Conceptual Diagram for Applying KM in Schools (Adopted from Cheng, 2013:p.345; Cheng, 2015a:p.74)

Cheng (2013, 2015a) presents a conceptual diagram (See Fig. 2.4) illustrating KM's application in schools. The diagram depicts the knowledge hierarchy, with data and information representing explicit knowledge and knowledge encompassing tacit knowledge competences (Sallis & Jones, 2002; Cheng & Chu, 2018). KM enables schools to gather, analyze, and generate explicit knowledge assets from data and information. It also aids teachers in developing tacit knowledge competences for action-taking, problem-solving, and decision-making, ultimately improving school performance. This approach fosters continuous improvement by producing explicit knowledge assets and cultivating tacit knowledge competences.

KM in education empowers school knowledge leaders to access and utilize organizational knowledge effectively for teaching (Nonaka & Takeuchi, 1995; Hansen et al., 1999; Zack, 1999; Cheng, 2015a, 2019a). It involves transferring, retrieving, sharing, and storing knowledge to enhance school performance (Cheng et al., 2017a). KM focuses on capturing, creating, sharing, and reusing knowledge to enhance teaching and learning (Cheng, 2019a).

During that time, the implementation and progress of KM in HK education were relatively new compared to other fields, as confirmed by international literature (Wu & Cheng, 2014). KM is officially incorporated into the HK Secondary Education Curriculum Guide (2017) because EDB states clearly that “it is essential for schools to attach importance to the development of a culture of learning and sharing among teachers and a KM system to facilitate the professional development of teachers” (CDC, 2017, Booklet 11, p.2).

The following section discusses why KM is significant for school development especially in HK context. Implementing KM in schools is crucial for management practices, professional development, strategic planning, and student support (Cheng, 2013b; Chu, 2016a; Hu, 2019). Schools can utilize KM as an organizational tool to enhance teachers’ capabilities in SCT policy planning, implementation, evaluation, and monitoring. Bridging the gap for effective SCT planning and implementation is

vital, necessitating the exploration of avenues to enhance the capacity of school knowledge leaders. KM facilitates the acquisition and creation of PCK by teachers, addressing implementation gaps (Cheng, 2019a).

KM's objective is to help schools establish effective structures and mechanisms for acquiring, applying, sharing, retaining, and creating knowledge (Cheng, 2012a). It serves a dual purpose: aiding in problem-solving, decision-making, and PCK development (Cheng, 2019a). KM can generate knowledge to support SCT policy implementation in schools. Consequently, schools can actively develop diverse SCT teaching and learning plans that cater to student needs using KM. However, since not all teachers possess a strong SCT knowledge foundation, establishing a knowledge sharing platform in schools becomes invaluable. Such a platform enables teachers to exchange SCT knowledge and collaboratively develop suitable teaching strategies, with KM playing a vital role.

Implementing KM in schools enables sharing and constructing SCT knowledge among teachers, enhancing teaching effectiveness. Neglecting their SCT knowledge diminishes teaching effectiveness and risks losing valuable knowledge assets when teachers depart (Cheng, 2019a), hindering teaching effectiveness and impeding the SCT professional development of other teachers.

KM aims to facilitate interpersonal connections, enabling the sharing of tacit

knowledge and its conversion into explicit knowledge for organizational benefit (Chinowsky & Carrillo, 2007). Orphan knowledge, as defined by Caddy et al. (2001), refers to unused, forgotten, ignored, or neglected knowledge within an organization, distinct from tacit knowledge, which is consciously known (Durna & Demirel, 2008). To prevent orphan knowledge and promote ownership, Chan (2022) suggests training middle managers in knowledge audits, fostering an environment conducive to KM adoption.

KM facilitates knowledge sharing and retention, supporting educational reforms (Cheng & Lee, 2019). Integrating KM with teaching and learning processes converts tacit knowledge into explicit knowledge and prevents orphan knowledge (Caddy, 2001; Martin, 2005; Chan, 2022). It improves teachers' effectiveness and performance, addressing teaching and learning challenges (Cheng, 2019a). A KM strategy aligned with the core teaching and learning process is crucial for successful implementation (Du Toit & Steyn, 2011).

KM aids teachers in addressing teaching and learning challenges arising from the educational and curriculum reforms, enhancing their effectiveness (Bhusry & Ranjan, 2012; Cheng, 2015a, 2019a, 2023a; Cheng et al., 2017; Cheng & Lee, 2019). When teachers understand the value of KM, they willingly embrace and promote its successful implementation (Chu, 2014).

When implementing KM in education, schools need a strategy aligned with their major concerns. School knowledge leaders should prioritize integrating KM activities with teaching and learning, a crucial step highlighted by Du Toit & Steyn (2011). Cheng (2019a) recommends aligning teaching materials and records with the school's mission and vision.

2.4.3 The Key Strategies to Implement KM

In this section, the primary strategies employed for KM in the school context will be explored. As outlined by Zack (1999), organizations can utilize two main KM strategies, namely codification and personalization.

Codification is an IT-based KM strategy, while personalization focuses on people (Sveiby, 2001; Chu, 2013; Cheng et al., 2017; Chan, 2022). LS, as per Cheng's research (Cheng et al., 2017; Cheng, 2017a, 2019a), can implement both personalization and codification strategies, leveraging knowledge for school development.

The personalization strategy in KM focuses on sharing tacit knowledge competences (Ho et al., 2010), including personal experiences, insights, and knowledge (Jordan & Jones, 1997; Snowden, 2002). It emphasizes person-to-person contact for knowledge sharing (Hansen et al., 1999; Osterloh & Frey, 2000). This strategy involves knowledge retrieval, sharing, and utilization (Cheng et al., 2017).

Lesson-preparation meetings that encourage knowledge sharing qualify as personalization strategies (Cheng, 2019a). Professional development activities like collaborative action research, professional learning communities, CoP, and Learning Circle facilitate face-to-face knowledge exchange (Nicolas, 2004). Adopting the personalization strategy requires investing in processes, tools, and networks that support personal interactions for knowledge sharing (Benbya & Belbaly, 2005; Merono-Cerdan et al., 2007).

Codification uses technology for storing and retrieving explicit knowledge, while personalization focuses on interpersonal knowledge sharing. The personalization strategy emphasizes face-to-face interactions like collaborative action research and professional learning communities (Nicolas, 2004). In contrast, codification relies on a KM system for storing and analyzing explicit knowledge (Andreeva & Kianto, 2012). Implementing the codification strategy requires substantial investment in a KM system (Lee & Hong, 2002). Successful KM in schools combines both strategies for leveraging knowledge in school development (Cheng, 2017a).

Cheng (2015a) highlights codification as a commonly used KM strategy in schools. Successful codification requires storing, sharing, and utilizing explicitly documented knowledge and teachers encoding their knowledge into shared repositories (Cheng, 2015a). A digital archive, based on Alavi & Leidner (2001),

supports knowledge processes within organizations. Codified knowledge, including guidelines, manuals, agendas, and minutes, enables effective school management and quality education (Cheng et al., 2017).

Cheng (2012a) shows that schools in HK mainly use interpersonal knowledge sharing for personalization. Creating a CoP within schools is important for teaching competency and sustainable development. Research by Cheng et al. (2017) indicates that combining personalization and codification strategies improves school development.

Cheng (2019b) finds that the people-based KM strategy predicts knowledge sharing and internalization among teachers, while the ICT-based strategy is effective for knowledge sharing only. Face-to-face meetings are effective for knowledge transfer in education (Kaiser et al., 2016), where interpersonal communication is preferred over ICT (Cheng, 2012a; Cheng et al., 2017). Personalization and codification strategies can be used together to maximize the benefits of tacit and explicit knowledge (Gammelgaard & Ritter, 2005; Venkitachalam & Busch, 2012; Cheng, 2019a).

LS combines codification and personalization strategies to generate and preserve PCK through a knowledge sharing platform (Cheng, 2018a, 2019a). According to Cheng (2019a, 2019b), LS is a KM process involving applying, creating, retrieving,

sharing, and storing knowledge. It is a commonly used approach to manage teaching knowledge in schools. In LS, teacher teams collaborate to plan and research lessons, drawing from internal and external sources. They implement and share knowledge, creating new insights, all documented through codification (lesson plans).

LS involves collaborative efforts among teacher teams to design and investigate lessons. It follows a Plan-Do-Check-Act (PDCA) process, aiming to enhance teaching and learning by converting teachers' tacit knowledge into explicit knowledge for dissemination (Cheng, 2015a, 2019a). Cheng (2019a) describes the PDCA process of LS as follows: During lesson planning ('Plan' phase), teachers actively share knowledge, leveraging and co-constructing tacit knowledge, which is then codified into explicit teaching knowledge within lesson plans and instructional materials.

During the 'Do' phase, the teacher executes the lesson while being observed by peers. This enables teachers to put into practice and internalize explicit teaching knowledge, transforming it into tacit teaching knowledge through classroom practices. The 'Check' stage allows teachers to assess the effectiveness of the implemented lesson plans. Through this evaluation process, tacit teaching knowledge can be constructed, exchanged, and generated among teachers. Subsequently, the newly developed explicit knowledge is stored as lesson plans and teaching materials for future reuse or subsequent teaching endeavors. Cheng (2023a) also recommends that

schools should adopt LS and the SECI model to implement the 21st-century curriculum.

2.4.4 Section Summary

Knowledge is crucial for a school's sustainability. KM in schools captures, creates, shares, and reuses knowledge to enhance teaching and learning, saving time and effort while improving school performance. KM establishes effective structures for acquiring, applying, sharing, retaining, and creating knowledge within schools. Implementing KM preserves knowledge when experienced teachers leave and enhances schools' capacity for planning. Codification and personalization are primary KM strategies used. LS integrates both strategies to generate and safeguard PCK through knowledge sharing.

2.5 Knowledge Leadership

Knowledge leaders in schools are vital for organizational KM and should actively engage in KM efforts, they influence knowledge creation and learning (Micić, 2015). Knowledge leaders can foster a culture that encourages the sharing, utilization, and acquisition of new knowledge among teachers and teams.

2.5.1 Leadership Roles in KM Implementation

Leadership plays a crucial role in value creation, innovation, and KM implementation (Besen et al., 2017). Leaders inspire and motivate followers to

acquire knowledge, embrace change, and share it with others (Micić, 2015). Their behavior sets the standards and practices within the organization (Carmeli & Sheaffer, 2008). Effective leadership in KM implementation involves promoting knowledge use for the collective benefit, creating a knowledge-sharing culture, and aligning leadership behavior with the school's organizational culture (Jain & Jeppesen, 2013; Stylianou & Savva, 2016). Encouraging knowledge sharing, defining KM strategy, supporting activities, and implementing a reward system are also important leadership roles (Doğan & Kılıç, 2009). Trust, transparency, and honesty foster knowledge sharing and transfer, while leadership support from middle managers positively influences knowledge sharing and innovation performance (Mas-Machuca, 2014; Muhammed & Zaim, 2020).

2.5.2 The Theory of Knowledge Leadership in Firms articulated by Nonaka and his colleagues: Strengths and Shortcomings

The theory of knowledge leadership, as articulated by Nonaka and his colleagues, has strengths and weaknesses. Nonaka emphasizes the creation of organizational knowledge occurs through an ongoing dialogue between tacit and explicit knowledge (Nonaka, 1994) and continuous “practice” (Ichijo & Nonaka, 2007, p.18) as “synthesis of action” (Ichijo & Nonaka, 2007, p. 22). Individuals are responsible for developing new knowledge, while organizations play a crucial role in expressing and

enhancing it. That is why knowledge leadership matter. Nonaka et al. (2000) highlight the importance of knowledge leadership in “leading and promoting the knowledge-creating process” through “providing the knowledge vision”, “developing and promoting the sharing of knowledge assets”, and “building, connecting and energizing *ba*” (Nonaka et al., 2000, p22-29).

Nonaka (1988, 1994) proposes the “middle-up-down management model” (Nonaka, 1994, p.29) for efficient knowledge creation within organizations. In this model, middle managers assume the role of “team leaders” and “catalysts” (Nonaka, 1994, p.31), acting as “change-agents” (Nonaka, 1994, p.32) to facilitate the self-revolution of the organization. The top management sets the “visions for direction” (Nonaka, 1994, p.30) and establishes the deadline for their realization. While the top management expresses the aspirations of the organization, lower-level managers focus on the actuality of the situation. Middle management bridges the gap between these perspectives, promoting concurrent knowledge creation among all management levels (Nonaka, 1994). Notably, Nonaka’s (1994) model emphasizes extensive collaboration among top, middle, and lower managers.

Nonaka et al. (2000) highlight the crucial significance of knowledge leadership in enabling the knowledge-creating process. They propose the SECI model, which portrays knowledge creation as a spiral originating from the SECI process. The SECI

process is described as the “engine” driving the entire knowledge creation process (Nonaka & Takeuchi, 1995, p. 57), supported by *ba* and knowledge assets. Effective leadership of this process requires dialectical thinking. The significance of top management in articulating the organization’s knowledge vision is highlighted, along with the crucial role of middle management as “knowledge producers” (Nonaka et al., 2000, p.22) who energize *ba* through active interaction and leadership.

Middle managers, as knowledge leaders, foster the SECI process, guided by the knowledge vision set by top management. Their crucial role lies in promoting organizational knowledge creation through all modes of knowledge conversion, with a significant focus on “externalization” (Nonaka et al., 2000, p.29). They gather and synthesize tacit knowledge from various sources, transforming it into explicit knowledge and incorporating it into new concepts, technologies, products, or systems. Reflective practices are essential for middle managers to accomplish this. According to Schon (1983), through reflection, they can transcend established theories and techniques and construct new theories.

Middle managers play a vital role in facilitating the knowledge spiral across conversion modes and organizational levels. To effectively do so, they must assess the situation, understanding the direction of the knowledge creation process and the available internal and external knowledge for conversion. Based on this assessment,

they adapt and make necessary adjustments. Improvisation is emphasized by Weick (1991) as crucial in dynamic knowledge creation, especially with tacit knowledge. Hence, middle managers should possess improvisational abilities and encourage participants to do the same.

Successful knowledge creation relies on “distributed leadership” and “middle-up-down management” (Nonaka et al., 2000, p.22-23), where top knowledge leaders provide the knowledge vision and facilitate the development and sharing of knowledge assets, while middle knowledge leaders energize *ba*, enabling the continuous spiral of knowledge creation (Nonaka et al., 2000). Hart (2009) notes that Nonaka et al. (2008) propose a flexible and distributed leadership model that emphasizes adaptive responses to environmental changes, allowing the organization to actively respond and turn knowledge into wisdom in real-time. Nonaka et al. (2000) also highlight the importance of organizational members acting as knowledge leaders through self-organizing teams, which enhances the likelihood of discovering valuable information. Furthermore, cultivating an environment of love, care, trust, and commitment among organizational members is crucial as the foundation for knowledge creation.

In summary, top and middle managers, as knowledge leaders, have responsibilities such as providing the knowledge vision, developing and sharing

knowledge assets, energizing *ba*, and facilitating continuous knowledge creation. The strength lies in the focus on top management's vision and middle management's role as knowledge producers in energizing *ba*. However, a drawback is the potential neglect or underestimation of the significant contribution of front-line employees.

Ichijo & Nonaka (2007) explain the process of building, maintaining, and connecting *ba*. Knowledge leaders facilitate *ba* by providing physical, virtual, and conceptual spaces that foster interactions among participants. Creating a task force is an example of intentionally establishing *ba*. Leaders must carefully select participants to effectively build *ba*. Middle managers should also identify and leverage spontaneously formed *ba*. *Ba* is not just a CoP but also a dynamic “space for the creation of knowledge” (Nonaka et al., 2008, p.36). Knowledge leaders assess interactions among members and external environments to recognize emerging *ba* and establish effective connections. They play a vital role in understanding and connecting different *ba*.

According to Ichijo & Nonaka (2007), leadership in knowledge-creating firms has evolved to involve active engagement from all members, rather than a select few elites. Shared discipline among members enables a dynamic chain reaction between strategy development and implementation. While the middle-up-down mechanism remains “key” (Ichijo & Nonaka, 2007, p.27), the contribution of front-line employees

is acknowledged more fairly. However, the explicit articulation of their knowledge leadership role is still lacking. Ichijo & Nonaka (2007) also highlight the significance of knowledge leaders facilitating ongoing dialogues and practices to “evangelize” (Ichijo & Nonaka, 2007, p.28) the knowledge vision and drive objectives throughout the organization.

Phronetic knowledge leadership skills, described as flexible and distributed, are recognized as the primary catalyst for knowledge creation (Scalzo & Farinas, 2018), with their effectiveness depending on the context of application. Nonaka et al. (2008) highlight the importance of knowledge leaders connecting various *ba* to form a self-organizing knowledge ecosystem. Rocha et al. (2022) establish a connection between phronesis, practical wisdom, KM, and leadership. These findings align with Nonaka and Takeuchi’s perspective that KM is a social endeavor, relying on knowledge leaders’ personal capabilities and the application of tacit knowledge, which resonate with the concept of phronesis.

von Krogh et al. (2012) utilize Nonaka’s knowledge creation theory as a foundation and conduct a literature review, which reveals a predominant focus on central, upper-echelon leadership in knowledge creation processes, neglecting context and knowledge assets. To address these limitations, von Krogh et al. (2012) propose a situational leadership framework for organizational knowledge creation. This

framework includes a continuum from centralized to distributed leadership across three layers: the core layer for local knowledge creation, the conditional layer for resource and contextual support, and the structural layer for establishing the overall framework and direction of knowledge creation. von Krogh et al. (2012) contribute to the theory of knowledge leadership by highlighting three layers of knowledge creation activities, each linked to different leadership styles. These styles encompass centralized, situational, and distributed knowledge leadership, with a focus on empowerment and autonomy in the knowledge creation process.

Gourlay (2006) criticizes the SECI framework for conceptual weaknesses, including the omission of inherently tacit knowledge and a subjective definition of knowledge creation primarily attributed to managers. Gourlay (2006) notes that Nonaka argues knowledge is created when managers decide what counts as knowledge for the organization. While aspects of the theory have been modified since the 1990s (Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka et al., 2001; Nonaka et al., 2000), the central element of SECI process as the engine remains unchanged (Nonaka & Toyama, 2003).

This study suggests a three-tiered knowledge leadership approach to address the limitations of Nonaka and his colleagues' narrow perspective on knowledge leadership. The proposed approach aims to enhance the SECI knowledge creation

process by integrating knowledge assets and *ba*. Its objective is to enhance teaching and learning knowledge by making tacit knowledge, which is typically unconscious, visible, retrievable, and combinable with conscious or propositional knowledge. This three-tiered approach operates at different organizational levels, providing valuable insights into improving SCT PCK.

2.5.3 School Knowledge Leadership in KM

The school is a learning organization and a knowledge-creating entity (Nonaka & Toyama, 2003). The SECI model is widely recognized for understanding knowledge creation (Nonaka, 1994). Leadership plays a vital role in KM processes (Demirel & Seçkin, 2008; Balkar, 2012). Lakshman (2007) emphasizes the role of leaders in institutionalizing ongoing KM that meets organizational needs. Knowledge leadership involves creating conditions for effective KM implementation (Holsapple & Jones, 2007).

Centralized knowledge leaders plays a crucial role in KM processes, including creating conditions for implementation, institutionalizing KM, and fostering a culture of knowledge sharing (Holsapple & Jones, 2007; Lakshman, 2007; Demirel & Seçkin, 2008; Balkar, 2012). Knowledge leaders in schools are responsible for promoting a culture of knowledge sharing, facilitating knowledge transfer, and supporting mutual learning (Doğan & Kılıç, 2009; Yang et al., 2014).

Middle managers as knowledge leaders build relationships, drive cultural change, and possess interpersonal and organizational development skills (Yang et al., 2014).

Middle managers act as change agents, implement the knowledge agenda, motivate others, and provide strategic vision (Singh, 2011). They play a crucial role in KM practices and require support from higher-level leaders (Yilmaz, 2014).

Zhang & Guo (2020) define knowledge leadership as a process where an individual influences and supports other teammates in continuous learning to achieve organizational goals. Teacher as distributed knowledge leadership, in this study, refers to the ongoing process where a teacher leader influences and supports other teachers in continuous teacher learning and promoting knowledge creation and transfer to achieve school goals.

Xia et al. (2019) define knowledge leadership as a process of supporting subordinates in learning and development. They suggest that individuals may perform differently in knowledge sharing depending on their level of knowledge leadership. In this study, middle managers as situational knowledge leaders support subordinate teachers in learning and development and bridge the connection between principals and teachers. Based on Nonaka & Takeuchi (1995), middle managers as knowledge leaders are responsible for acquiring, creating, identifying, promoting, sharing, and transferring knowledge within the school.

Vendrell-Herrero et al. (2020) state that knowledge leaders should also persuade and motivate their colleagues to improve their knowledge creation and transfer. In this study, centralized knowledge leaders are defined as promoting knowledge creation and transfer among their colleagues by articulating centralized leadership practices and improving organizational factors such as school development direction.

To effectively serve as knowledge leaders, school leaders need to drive KM initiatives, ensuring the successful creation, transfer, storage, and application of knowledge (Donate & de Pablo, 2015). Farnese et al. (2019) substantiate and enhance the theoretical foundations of the SECI model by developing a comprehensive multidimensional questionnaire called the KM SECI Processes Questionnaire (KMSP-Q). This questionnaire is specifically designed to capture the various knowledge conversion modes proposed by Nonaka. By utilizing the KMSP-Q, school knowledge leaders must assess their school's ability to manage new knowledge and identify the strengths and weaknesses of KM-related school policies and programs.

Table 2.2 The Practices of Knowledge Leadership

Studies	Practices of Knowledge Leadership
Nonaka et al. (2000a)	<ul style="list-style-type: none"> -Providing knowledge vision; -Developing and promoting the sharing of knowledge assets; -Building, connecting, and energizing the context for knowledge sharing (Ba); -Promoting and facilitating the SECI knowledge creation processes.
Viitala (2004)	<ul style="list-style-type: none"> -Providing directions of learning; -Establishing a supportive climate for learning in workplace; -Supporting learning processes on both individual and organizational levels;

	-Serving as role models for followers in the learning process.
Van Winkelen (2006)	-Establishing and maintaining key relationships; -Inspiring others to commit to and engage in better knowledge practices; -Being mentors and role models for KM in practices; -Communicating ideas and expertise with peers for effective knowledge sharing.
Lakshman (2007)	-Emphasizing the importance of knowledge to their organizations; -Creating technological and social networks that enhance knowledge sharing and capture; -Participating in the knowledge networks and activities for knowledge acquisition and sharing.
Foon & Yen (2011)	-Strategically setting knowledge visions and directions; -Developing knowledge culture and environment; -Supporting knowledge strategies and processes to encourage the sharing and development of knowledge.
Zhang & Cheng (2015)	- Developing a shared vision; - Promoting a trustworthy and collaborative environment.
Hu (2019)	-Setting school vision; -Promoting teachers' learning and professional development; -Cultivating a school culture for knowledge sharing; -Seeking partners' supports.
Gürlek & Cembetçi (2020)	-Promoting knowledge acquisition, sharing, and application; -Acting as role model of leaders; -Ensuring knowledge is effectively managed; -Providing suitable environment for knowledge behaviors, guides employees through knowledge processes and tolerates mistakes; -Mobilizing human resource, promoting innovation, and improving performance.
Kazak (2021)	-Accessing and using knowledge as role model; -Demonstrating and spreading the power of knowledge; -Making learning an indispensable habit and culture of the organization; -Activating the knowledge assets; -Fostering trust among teachers for promoting knowledge creation, processing, sharing and storage; -Using ICT in the process of KM implementation.

(Adapted and adopted from Hu ,2019: p.47)

The practices of knowledge leadership play a crucial role in influencing the direction and effectiveness of KM in organizations (Nguyen & Mohamed, 2011).

Through the adoption of appropriate KM practices, knowledge leaders can foster the

enabling factors necessary for effective KM within their organizations (Politis, 2002; Crawford et al., 2003; Donate & de Pablo, 2015).

Table 2.2 displays findings on knowledge leadership practices. This study builds on Hu's (2019) research and identifies common elements in KM implementation by organizational leaders. These elements include providing vision and direction, fostering a learning culture, promoting collaborative knowledge sharing, seeking partner support, cultivating a high-trust environment, using ICT for knowledge sharing and capture, and serving as a KM role model.

The following is the illustration of the several common elements emerge from the identified practices of knowledge leadership in implementing KM.

2.5.3.1 Setting School Vision towards KM

A critical success factor for implementing KM in schools and organizations is the establishment of a vision that emphasizes KM (Zack, 1999; Cheng, 2013b). A KM vision defines the direction for knowledge application, creation, enhancing, and sharing members' commitment to KM (Malhotra, 2001). It helps members understand the importance of KM for the competitive performance, organization's growth, and sustainable development (Chu, 2016). Incorporating KM into the organizational vision is crucial for successful KM implementation (Gold et al., 2001). Shared vision and mental model also predict system thinking (Cheng, 2009c).

2.5.3.2 Promoting teacher learning and professional development in KM

Professional development training programs are crucial for successful KM implementation in organizations (Wong & Aspinwall, 2005). They are recognized as a critical success factor for KM implementation (Choy & Suk, 2005; Hung et al., 2005). Training programs that enhance employees' understanding and skills in knowledge documentation and sharing significantly impact KM implementation (Yahya & Goh, 2002). Providing training for new and existing staff is key to facilitate KM and promote knowledge sharing (Al-Alawi et al., 2007). These programs should focus on developing awareness of KM's importance and understanding applicable strategies (Mentzas, 2001). Principals play a crucial knowledge leadership role in implementing KM in schools by fostering teacher learning and professional development in KM (Cheng, 2017a; Hu, 2019).

2.5.3.3 Cultivating a School Culture for Knowledge Sharing

Culture is a critical factor in the successful implementation of KM practices in organizations (Davenport & Prusak, 1998; Pan & Scarbrough, 1998; Martensson, 2000). A knowledge sharing culture, where knowledge is valued and actively supported, enables effective knowledge exchange (Gaál et al., 2010). CoPs, such as LS in schools, can cultivate this culture by facilitating knowledge sharing among teachers (Mosala-Bryant & Hoskins, 2017; Saeheaw, 2017; Cheng, 2019a, 2019b).

School leaders play a crucial role in supporting the development of CoPs and creating a knowledge-sharing culture (Lim et al., 2011; Cheng, 2017b). Principals, in particular, have a leadership role in implementing KM in schools and nurturing a culture that encourages knowledge sharing (Cheng, 2017a; Hu, 2019).

2.5.3.4 Seeking Partners' Support for KM

The success of KM implementation in organizations is influenced by external partners such as government, foundations, R&D institutions, and universities (Dabic, 2004; Halal, 2015). School leaders should actively seek support from external partners to implement KM successfully (Phlypo, 2008). Building partnerships with external organizations is a crucial strategy for KM implementation (Raulik et al., 2006; Cheng & Lee, 2014). Principals, as knowledge leaders, play a crucial role in implementing KM in schools by seeking support from external partners (Hu, 2019).

2.5.3.5 Fostering high-collegial trust working environment conducive to KM practices

The transfer of tacit knowledge, which resides within individuals' minds, is crucial for organizational survival (Sallis & Jones, 2002; Sprinkle & Urick, 2018). Establishing transparent and reliable relationships based on high-collegial trust is essential for facilitating effective KM practices (Williams, 2012; Cheng, 2019a). High levels of collegial trust contribute to knowledge sharing, innovation, and the development of social capital (Govier, 1997). Trust serves as the foundation for

creating a culture of knowledge sharing and removing barriers to information exchange (Lee & Choi, 2003). In a school environment characterized by high levels of trust, teachers feel secure in sharing their knowledge, which encourages the transfer of tacit knowledge (Cheng, 2019a). Collegial trust plays a cohesive role in professional learning communities and promotes effective operations, serving as an effective KM tool (Cranston, 2011; Pamela et al., 2015). Creating a safe space where members feel comfortable sharing is essential for knowledge socialization (Cheng, 2019a). Cultivating a culture of trust and respect among organizational members facilitates collaborative knowledge building and innovation (Nelson & Coopriider, 1996; Rahman & Hussain, 2014; Cheng et al., 2017). Trust simplifies collaborative knowledge sharing and supports successful KM implementation (Cheng, 2019a).

2.5.3.6 Using ICT to create technological networks that enhance knowledge sharing, capture and combination

ICT plays a crucial role in KM systems, enabling capabilities such as searching, accessing, gathering, storing, and distributing information (Cheng, 2015a). ICT facilitates knowledge sharing, overcomes barriers, and enhances accessibility (Davenport & Prusak, 1998; Alavi & Leidner, 1999). In education, ICT is essential for capturing expertise and connecting teachers through information systems (Alavi & Leidner, 2001). The advancement of ICT has opened new avenues for knowledge sharing in online settings and externalizing tacit knowledge (Yi, 2006; Khan &

Khader, 2014). Online environments and e-learning platforms can facilitate externalization processes and group meetings (Cheng, 2019a). To foster Cyber/Systemizing Ba, an online environment for knowledge combination, online networks, groupware, and databases are essential (Cheng, 2019a). ICT enables the transformation of explicit knowledge into organizational knowledge, promoting collective knowledge (Cheng, 2019a).

2.5.3.7 Being a role model for KM in practices.

Knowledge leaders play a crucial role in KM by serving as role models and actively participating in KM activities (Viitala, 2004; Van Winkelen, 2006; Lakshman, 2007). They influence behavioral patterns and promote the creation, dissemination, and utilization of new knowledge (Bandura, 1977; Shamim et al., 2019; Xia et al., 2019). Employees perceive knowledge leaders as role models and learn from their behaviors, particularly in knowledge sharing and application (Bertoldi et al., 2018; Shariq et al., 2019). Knowledge leaders who prioritize knowledge adopt a transformational leadership approach, inspiring intellectual growth, fostering a pro-learning culture, and guiding employees in effective KM (Viitala, 2004; Donate & de Pablo, 2015). Knowledge leadership enhances KM capacity by facilitating knowledge acquisition, application, and sharing (Gürlek & Çemberci, 2020). These findings align with Bandura's social learning theory, highlighting the influential role of knowledge leaders as role models in shaping organizational behavior (Gürlek & Çemberci, 2020).

2.5.4 The Importance and Role of Knowledge Leadership in KM

This section will explore the relationship between knowledge leadership and KM and highlight the significance of leadership roles, focusing on knowledge leadership.

2.5.4.1 The Importance of Knowledge Leadership in KM

KM plays a crucial role in schools by enabling effective decision-making, facilitating teacher learning, fostering an innovative environment, and promoting efficient work practices (Doğan & Kılıç, 2009). Knowledge leaders in educational institutions need to cultivate a culture that encourages knowledge sharing and utilizes knowledge in decision-making (Doğan & Kılıç, 2009). Effective KM requires strong leadership, and school leaders should support collaboration, innovation, and sharing to promote KM (Jain, 2015; Micić, 2015). Their support influences teachers' inclination to seek knowledge and engage in information sharing (Humayun & Gang, 2013).

School leaders should actively encourage and support the learning process to foster collaboration and performance among educators (Ainissyifa, 2012). The leadership skills of school principals are significant predictors of KM process competencies and the successful implementation of KM (Balkar, 2012; Chu, 2013).

Overall, these studies emphasize the importance of knowledge leadership and effective KM practices in promoting collaboration, enhancing learning environments, and driving positive outcomes in schools.

2.5.4.2 The Role of Knowledge Leadership in KM

The following section will discuss the significance of knowledge leadership roles in KM. Studies emphasize the importance of knowledge leadership in KM and its connection to knowledge application, storage, and transfer (Lakshman, 2007; Donate & Pablo, 2015). A knowledge leader is responsible for designing and overseeing the knowledge infrastructure within an organization (Kok, 2003).

Key skills for knowledge leaders include emotional maturity, enthusiasm, interpersonal communication, and networking abilities (Kok, 2003). They must effectively communicate KM goals and guide the necessary processes to achieve them (Singh, 2011).

Success in KM practices in educational institutions relies on knowledge leadership, a culture of knowledge sharing, and support from KM systems (Cheng et al., 2017). Knowledge leaders play a significant role in educating teachers about KM, defining their roles and skill sets, and establishing learning centers (Kok, 2003). Emphasizing knowledge leadership within schools fosters organizational learning (Chou & Ramser, 2019).

In term of the roles of knowledge leadership, there are at least six different roles of knowledge leadership after summarizing the literature above.

2.5.4.2.1 Allocating areas of expertise/advisers

Donate & de Pablo (2015) suggest that knowledge leaders should allocate areas

of expertise and advisers to enable team members to recognize their roles and communicate expectations for each member's work.

2.5.4.2.2 Role Model

Knowledge leaders play a crucial role in promoting teacher learning and engagement in knowledge activities within a team (Viitala, 2004; Hannah & Lester, 2009; Donate & de Pablo, 2015). Empowerment, inspiration, and motivation are key factors in knowledge creation, as highlighted by Lakshman (2005, 2007) and Von-Krogh et al. (2012). Leadership's function as a role model is essential for motivating employees to create and transfer knowledge (Lakshman, 2005, 2007; Von-Krogh et al., 2012).

2.5.4.2.3 Relational role in building cooperation and trust

Rivière & Sitar (2003) suggest that knowledge leaders should establish trust and commitment to help the organization achieve its knowledge and goals. According to Zhang & Cheng (2015), knowledge leaders need to establish relational strategies to foster a cooperative and trust-based context.

2.5.4.2.4 Building enabling conditions

Knowledge leaders should facilitate effective knowledge creation and integration through socio-cognitive and technological routes (Lakshman, 2009). They are responsible for establishing conditions that promote group characteristics and

processes like argumentation, diversity, politeness, and shared positioning to facilitate knowledge creation (Lakshman, 2009).

2.5.4.2.5 Creating social capitals

The significance of knowledge leadership in creating social capital for effective knowledge creation is increasingly recognized (Teigland, 2000; Tsang, 2001; Gooderham, 2007). Knowledge leadership is crucial for successful KM, and specific actions can facilitate the development of social capital required for effective knowledge creation.

2.5.4.2.6 Vision and Culture Builder

Zimmer (2011) stresses clear vision, unique culture, and leadership's importance. Ribière & Sitar (2003) highlight knowledge leaders' role in shaping school culture. They are crucial for effective KM processes, assessing existing knowledge, acquiring and creating knowledge, ensuring proper storage, and fostering a culture of sharing (Doğan & Kılıç, 2009). KM helps schools stay updated and incorporate scientific and technological advancements (Sakarya, 2006), supporting educational objectives and enhancing learning effectiveness. Active involvement of knowledge leaders in acquisition, sharing, storage, and utilization contributes to achieving school goals (Özsarıkamış, 2009). School leaders and teachers must devise effective strategies for successful KM implementation (Muratoğlu, 2005).

2.5.5 The Leadership styles of Knowledge Leadership in KM

2.5.5.1 Centralized Leadership, Situational Leadership and Distributed Leadership

Zeinabadi (2020) finds that teachers rarely share knowledge voluntarily, suggesting that principals can address this by demonstrating knowledge-sharing in their leadership role. Fullan (2002) stresses the leadership role of principals in prompting knowledge creation and transfer. Both highlight the crucial role of knowledge leaders in promoting knowledge-sharing among teachers and fostering a culture of knowledge-sharing in schools.

Von Krogh et al. (2012) propose a theoretical framework exploring the relationship between centralized and distributed leadership in organizational knowledge creation process. They view leadership as situated knowledge creation activities, emphasizing the significance of activity-based analysis to understand the dynamics among participants, processes, artifacts, and contexts that shape situational leadership (Cole & Engeström, 1993; Timperley, 2005; Von Krogh et al., 2012).

2.5.5.1.1 Three-tiered Knowledge Leadership

Von-Krogh et al. (2012) fill a gap in the literature by introducing a new framework that incorporates centralized, situational and distributed leadership at three levels of activity in organizational knowledge creation. The study of Von-Krogh et al., (2012) emphasizes the analysis of knowledge at the individual, group, and

organizational levels, providing insight to the concept of three-tiered knowledge leadership.

2.5.5.1.2 In terms of Principals', vice-principals', and PSMCD's roles as Centralized Knowledge Leadership

Cheng (2015a) argues that principals' leadership can enhance teachers' KM competencies, promote a collaborative learning culture, and integrate KM systems to support and sustain KM processes in schools. Von-Krogh et al. (2012) also suggest that centralized leadership at the structural layer is responsible for directing knowledge creation in organizations by allocating resources, defining forms, developing a knowledge vision, monitoring activities, and setting goals. They emphasize the crucial role of centralized leadership in the organizational process of knowledge application, creation, and transfer.

2.5.5. 1.3 In terms of Middle Managers' Situational Leadership

Robertson et al. (2003) show that centralized coordination by top management can deplete self-management at lower levels in the organization. Similarly, Mabey & Nicholds (2015) find that knowledge leadership operates at all levels and should be shared and distributed rather than confined to senior leaders or teams.

In terms of the Middle managers as the knowledge leader, Von-Krogh et al. (2012) encompasses situational leadership activities and propose that the middle

managers as knowledge leaders can offer situational knowledge leadership to provide context and resources for knowledge creation and shapes the facilitating conditions for the interplay between *Ba*, knowledge assets, and the SECI process.

2.5.5. 1.3 In terms of Teachers' Distributed Knowledge Leadership

In terms of the Teacher as the knowledge leader, Von-Krogh et al. (2012) propose that distributed leadership at the frontline level of local knowledge creation initiates and sustains knowledge creation by using and capturing knowledge assets. It also transforms the potential of *Ba* into functioning SECI processes.

2.5.5.2 Leadership Styles: Transactional Leadership, Transformational Leadership and Knowledge Leadership

Researchers have emphasized the importance of leadership in KM, and different types of leadership, such as transactional and transformational leadership, have been found to enhance KM capacity (Crawford, 2005; Birasnav et al., 2011; Birasnav, 2014; Bavik et al., 2018; Le & Lei, 2019).

Burns (1978) and Bass (1990) distinguish between transactional and transformational leadership approaches. Transactional leadership emphasizes task completion and exchanging benefits, rewards, and self-interest with followers. Transformational leadership focuses on inspiring and motivating followers to give their best for the organization. Bass (1985) suggests that schools under

transformational leadership strive for performance beyond expectations, driven by value-based self-sacrifice and a sense of higher purpose shared by both leaders and followers, as suggested by Gill (2006).

Gagne (2009) also argues that transformational leadership satisfies followers' needs for autonomy, competence, and relatedness, which are important for effective knowledge creation according to Nonaka (1994). Srivastava et al. (2006) find that empowerment is positively related to knowledge sharing, team efficacy, and performance. Transformational leadership supports followers' need for autonomy by emphasizing autonomous motivation (Gagne, 2009), which is crucial in the process of knowledge creation.

For school KM initiatives, transformational leadership is more advantageous, as it promotes knowledge acquisition and satisfies followers' needs for autonomy, competence, and relatedness, which are essential for effective knowledge creation (Politis, 2001, 2002; Srivastava et al., 2006; Gagne, 2009; Karakoç, 2010).

Although both transactional and transformational leadership attributes are important in KM, transformational leadership is considered more suitable for socialization, externalization, and internalization processes, while transactional leadership is better suited for combination (Bryant, 2003; Reinmoeller, 2004).

Combining transactional and transformational leadership attributes is

recommended for effective KM, where knowledge leaders serve as role models, motivate employees, and foster a learning culture (Viitala, 2004; Donate & de Pablo, 2015; Zhang & Cheng, 2015; Gürlek & Çemberci, 2020). Knowledge leadership attributes such as encouraging positive knowledge behavior, valuing knowledge sharing, and promoting collegial learning facilitate a school's KM implementation and enhance performance (Sadler, 2003; Chen & Huang, 2009; Williams & Sullivan, 2011; Farrell & Coburn, 2017).

Studies have examined the role of leadership in influencing and promoting employees' behavior in KM practices, including knowledge creation, storage, and transfer within schools. It is believed that successful leaders in KM implementation should involve employees at all levels of the organization. However, the most suitable leadership style for conducting KM activities still remains unclear (Analoui et al., 2013). According to Kazak (2021), smart schools should employ situational leadership that can accommodate different leadership styles to achieve predetermined goals, especially regarding three-tiered knowledge leadership. The leadership style options between the principal, middle managers, and teachers should be diverse and situational. An important responsibility of leaders is to foster knowledge sharing by supporting learning and facilitating continuous group learning (Singh, 2011).

2.5.6 Knowledge Creation and Transfer

2.5.6.1 Knowledge Creation

Collaborative teacher groups enhance knowledge creation, emphasizing argumentation, diversity, politeness, and shared positioning (Chiu, 2016). However, intrusive controversy and prioritizing power and status hinder knowledge creation (Chiu, 2016). Middle managers, as knowledge leaders, control and monitor actions, emotions, and knowledge, impacting collective knowledge creation (Chiu, 2016). *Ba*, distributed leadership, team-working atmosphere, collaborative community, and social capital contribute to knowledge creation in schools (Martín de Castro & Montoro Sánchez, 2013). Von Krogh et al. (2012) propose a dynamic framework for knowledge creation, considering knowledge assets, leadership, SECI, and *Ba* as contextual factors.

2.5.6.2 Knowledge Transfer

Knowledge creation and transfer are essential in KM (McKeough, 1995). Knowledge transfer among colleagues and units enhances organizational learning, productivity, and survival (Argote, 1999). However, empirical research on evidence-based leadership practices for overcoming transfer barriers and assessing effectiveness is lacking, hindering knowledge-driven collaboration. Gupta & Govindarajan (2000) emphasize the need for investigating organizational mechanisms and KM initiatives to

improve knowledge transfer. Riege (2007) suggests that enhancing knowledge transfer capacities and incentives improves school performance, with principals, middle managers, and teachers as key knowledge leaders. Understanding the dynamic nature of SCT knowledge transfer and considering knowledge needs, purpose, usage, and discrepancies between departments can enhance its effectiveness.

2.5.7 Leadership practices and organizational factors that enable Knowledge Creation and Transfer

In HK's competitive education landscape, identifying three-tiered knowledge leadership practices and organizational factors promoting KM is crucial (Chen & Huang, 2009; Ghasemi & Valmohammadi, 2018). Wei Choo et al. (2010) emphasize creating a conducive environment for knowledge creation and transfer in schools and establishing specific knowledge leadership practices and organizational enabling factors to institutionalize the SECI model.

2.5.7.1 The Leadership Practices and Organizational factors that enable the individual teachers to share their SCT tacit knowledge through Socialization

According to Farnese et al. (2019), socialization is the initial step in the SECI knowledge creation spiral, involving the transfer of tacit knowledge at the individual teacher level. Tacit knowledge can be acquired through observation, imitation, practice, and participation in formal and informal communities (Yeh et al., 2011;

Cheng, 2019c). Effectively utilizing tacit knowledge is crucial for achieving competitive advantage in schools (Ozmen, 2010), and capturing and making tacit knowledge widely available is necessary for sustainable improvement (Kidwell et al., 2000). Socialization facilitates the sharing and exchange of tacit knowledge at the interpersonal level (Chatti et al., 2007).

Tacit knowledge's implicit nature makes it challenging for novice teachers to access it through explicit symbols, hindering its activation, construction, and transformation in the classroom, according to Zheyu et al. (2021). To address this, both primary schools in this study implemented mentoring programs for novice teachers, which is a classic example of school socialization (Cheng, 2023a).

Mentoring programs in schools serve as a form of socialization, enabling the transfer of tacit knowledge from experienced teachers to novices (Farnese et al., 2019; Zheyu et al., 2021). Mentoring promotes learning, personal growth, and skill development for novice teachers within a supportive environment (Farnese et al., 2019). Schools encourage sharing of SCT tacit knowledge among teachers through assimilation, modeling, and observation of implicit skills embedded in professional practice, often implemented through mentoring systems.

Mentoring is a common school socialization strategy that promotes learning and practical skill development for novice teachers. It exists within a shared care,

commitment, friendship, love, and trust environment, serving as an originating *Ba*.

Mentoring helps novice teachers gain a deeper understanding of professional teaching skills and fosters personal growth in their roles as educators.

2.5.7.2 The Leadership Practices and Organizational factors that facilitate subject teachers to externalize their SCT tacit knowledge into subject level explicit knowledge through Externalization

Externalization, according to Cheng (2019c), involves converting tacit knowledge into explicit knowledge through dialogue and text record at departmental levels. It is important for knowledge creation, dissemination, and sharing. Nonaka & Takeuchi (1995) highlight its role in creating new concepts, while Collins (2001) emphasizes its significance in contextual understanding and problem discovery. In the SCT Learning Circle, teachers have the opportunity to share their SCT tacit knowledge through peer discussions and convert it into explicit knowledge. The Learning Circle serves as a dialoguing *Ba* that facilitates professional dialogue and captures valuable ideas and insights. Teacher collaboration enhances SCT knowledge by providing diverse contexts and collective intelligence, leading to the creation of new knowledge for future access and sharing. According to Cheng (2023a), post-lesson conferencing is a knowledge externalization process too.

2.5.7.3 The Leadership Practices and Organizational factors that facilitate the

*combination of group-specific SCT knowledge into school SCT knowledge
through Combination*

Combination, according to Cheng (2019a), involves converting explicit group knowledge into organizational knowledge for a school's sustainable development. Integration of relevant concepts into a knowledge system is important (Yeh et al., 2011). In the SCT Learning Circle, it serves as a systemizing *Ba* and facilitates the combination process occurs at the individual and team levels. Teachers collaborate during interdisciplinary lesson planning, merging their understanding of SCT subject knowledge with their previous knowledge. Cross-disciplinary sharing sessions also facilitate the combination of SCT explicit knowledge at the school level.

*2.5.7.4 The Leadership Practices and Organizational factors that enable individual
teachers to internalize the SCT explicit knowledge into their tacit knowledge
through Internalization*

Internalization, as defined by Cheng (2019a), involves the understanding and absorption of collective explicit knowledge by teachers through classroom lesson practice. According to Nonaka & Takeuchi (1995), internalization is the conversion of explicit knowledge into tacit knowledge through learning by doing. In the school context, internalization occurs when the school's SCT explicit knowledge is retransformed into individual SCT tacit knowledge through professional practice.

Teachers acquire the school's SCT explicit knowledge through lesson practices, which is essential for the internalization process. The SCT learning circle serves as an exercising *Ba*, facilitating the internalization of SCT explicit knowledge, enabling individual teachers to internalize SCT principles and apply them in classroom instructional activities. According to Cheng (2023a), lesson implementation in LS is also a knowledge internalization process.

2.5.8 The Definition and Theoretical Framework of Knowledge Leadership in KM in this study

This study defines three-tiered knowledge leadership, comprising the roles of principals, vice-principals, and PSMCD, as centralized knowledge leadership. Middle managers are considered as situational knowledge leaders, while teachers are regarded as distributed knowledge leaders. The leadership practices create conditions that facilitate continuous improvement in the spiral cycle of knowledge creation and transfer, drawing upon the arguments articulated by Von Krogh et al. (2012).

In this study, knowledge leadership involves centralized leaders, situational middle managers, and distributed teacher leaders collaborating with a shared vision and system thinking to create favorable conditions for KM initiatives. Organizational factors supporting effective SCT implementation and KM processes include role models, alignment with the school's vision, collegial trust, knowledge-sharing culture,

supportive infrastructure, professional development opportunities for teachers, and partner support (See Fig. 2.5). These factors contribute to KM institutionalization and effective SCT implementation.

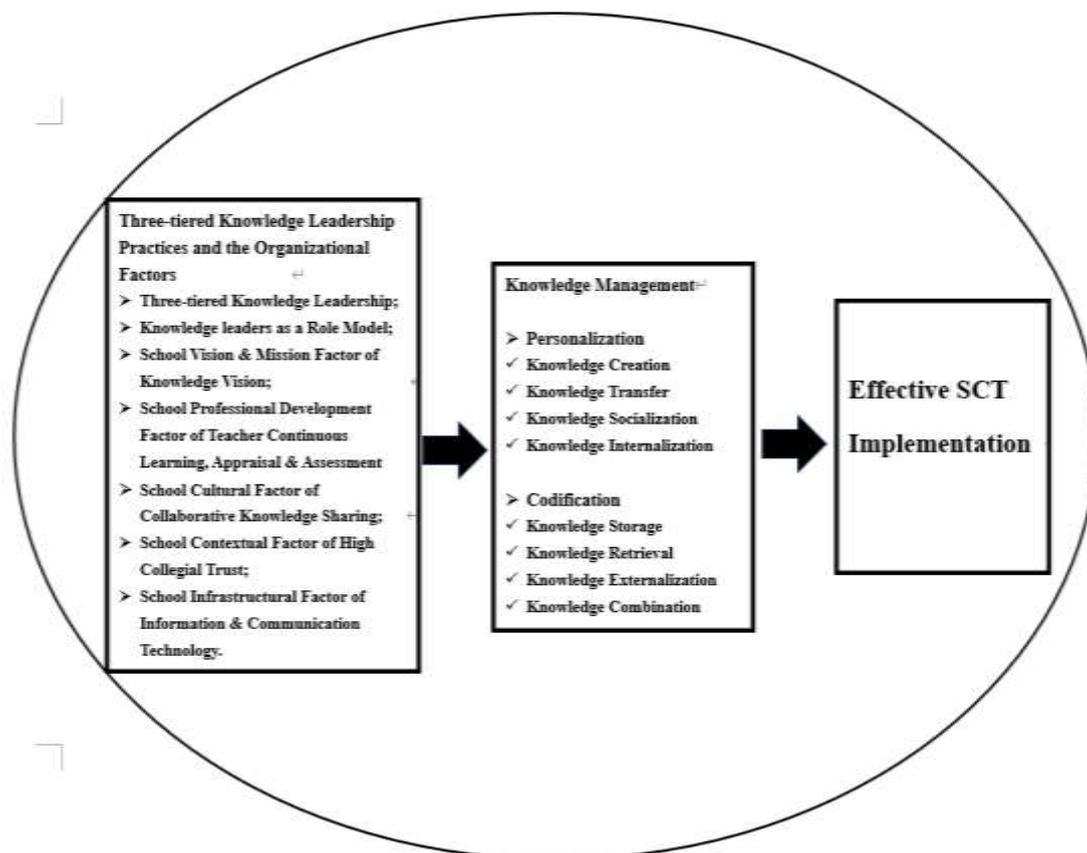


Fig. 2.5 A Conceptual Model on the Three-tiered Knowledge Leadership Practices for School KM Implementation and the Relationship between Knowledge Leadership Practices, KM, and Effective SCT Implementation

2.5.9 Section summary

Motivating teachers to engage in knowledge creation and transfer can be challenging. Clear expectations and effective communication from knowledge leaders are important in encouraging teacher excellence. In HK, knowledge is crucial for competitive advantages. Knowledge leadership facilitate KM implementation and

promotes effective SCT. This study suggests that three-tiered knowledge leaders can create conducive conditions and environments to support KM implementation and enable the acquisition, creation, and transfer of SCT knowledge, ultimately leading to effective SCT implementation.

2.6 Chapter Summary

This chapter reviews relevant literature to support the study's theoretical understanding. SCT knowledge is crucial for primary schools to create a competitive advantage in the current educational environment. Effective knowledge creation and transfer of SCT knowledge can positively impact school performance. Three-tiered knowledge leadership can enhance KM initiatives and promote SCT knowledge creation and transfer. The SECI model is suitable for this study as it considers knowledge creation and transfer as dynamic, simultaneous, and spiral processes. The model also emphasizes the importance of the acquirer of knowledge for continuous improvement, aligning with the objectives of this study.

CHAPTER 3 THE METHODOLOGY OF RESEARCH

This chapter presents the research methodology. Cross-case study is employed as the research approach. Purposive sampling selects the cases: X School and Y School in HK. Data collection involves documentary review, in-depth interviews, and observation. The data from these sources are analyzed using a hybrid approach of deductive and inductive coding.

3.1 Research Methodology

Baxter & Jack (2008) define a case study as a research approach that examines a phenomenon in its context, utilizing diverse data sources to uncover multiple facets. Case studies are ideal for exploring “why” and “how” questions in exploratory research (Edmondson & McManus, 2007). Eisenhardt (1989) highlights case studies as a robust method for studying multiple cases rigorously. This study utilizes the case study method to closely examine data within school contexts and investigate their culture of knowledge management and sharing (Zainal, 2007).

The study uses cross-case analysis to identify three-tiered knowledge leadership practices and organizational factors that influence KM implementation and the SCT. Case studies are valuable for exploring contextual conditions and understanding construct relationships (Yin, 2018). The study aims to develop testable theories by analyzing the impact of three-tiered knowledge leadership on knowledge creation and transfer using Nonaka’s SECI model. It seeks to construct a theoretical model

describing the relationship between knowledge leadership practices, KM, and SCT implementation through cross-case study.

3.2 Case Selection

Applying purposive sampling, this study selects two aided primary schools, namely X School and Y School, as the cases for investigation due to their differing levels of instructional capacity and attractiveness in parental choice. Additionally, the two selected schools have different expectations regarding the influence of COVID-19 on students' Territory-wide System Assessment (TSA) attainment rate and the enrollment of sixth-grade graduates in secondary schools that offer English classes. Y School, in particular, has a more positive expectation due to the effective implementation of SCT Learning Circles since 2018. It is noteworthy that Y School has been more successful than X School in this regard.

These schools have implemented KM and SCT policies. Purposeful sampling, widely employed in qualitative research, selects information-rich cases relevant to the phenomenon of interest (Palinkas et al., 2015). Selecting these critical cases enables logical generalization and maximizes the application of information to other cases (Patton, 2002). The study examines the impact of three-tiered knowledge leadership practices on KM and SCT implementation in primary schools (Cohen et al., 2018). X School and Y School were selected for their typicality (Suri, 2011) and

implementation of KM and SCT policies.

Both schools participated in the “Pilot Project of SCT” organized by the Centre for SCT at HKIEd (now known as EdUHK) in the 2008-09 academic year, which was one year ahead of the implementation of the SCT policy across the territory. They have since adopted SCT as a school policy. Through a cross-case study design, the research aims to examine the KM strategies and processes of SCT knowledge creation and transfer guided by knowledge leadership (Creswell & Poth, 2018).

3.2.1 The First Case: The X School

3.2.1.1 Background of X School

The first case study focuses on X School, a public estate primary school in the southern part of New Territories West, HK. X School is a subsidized, non-religious institution that uses Chinese as the medium of instruction. The majority of its students come from low socioeconomic backgrounds. The former principal of X School saw SCT implementation as crucial for the school’s sustainable development. With 25 standard classrooms covering approximately 4440 square meters, X School, despite being located in a remote underprivileged area, offers a well-balanced curriculum and prioritizes SCT to address learner diversity.

“The school mission is to lay a firm educational foundation that nurtures the holistic and moral development of students within a stimulating

learning environment”. (School Mission of X School, cited from the *Primary School Profiles 2022*)

X School faces a challenge with declining student numbers and smaller classes, affecting P1 student admissions. Despite being part of an established educational body, X School competes with other primary schools for P1 student enrollment, which includes 31 primary schools. To tackle this challenge, X School focuses on improving educational performance to remain competitive and attract parents. Enhancing teaching and learning quality through SCT has become a crucial objective for X School in achieving sustainable competitiveness.

It states that approximately 33% of X School’s graduates have secured a place in English-medium secondary schools in the academic year 2020-21. However, the TSA attainment rate is unavailable as X School has not participated in TSA in recent years due to concerns that it may be adversely affected by the COVID-19.

“We choose not to attend TSA due to concerns about the negative impact of the COVID-19 pandemic, which would lead to a decrease in the TSA attainment rate. Additionally, the development of spoken communication skills affected by the pandemic will likely result in a decrease in the percentage of sixth-grade graduates entering English-medium secondary schools.”

(X2)

3.2.1.2 The principal, middle managers, and teachers of the X School

The current principal of X School, who took office in the 2019-20 academic year, has a wealth of experience in leading and managing primary schools. She holds a doctoral degree in education and specializes in university and school partnerships. Recognizing the importance of preserving the school's knowledge asset, the current principal has chosen to implement KM. This decision was influenced by the loss of previous valuable SCT knowledge, which is regarded as a significant knowledge asset for the school.

However, X School is currently facing a challenge with succession planning as key administrators, including vice-principals, the prefect of studies and middle managers, are transitioning to new opportunities, retiring, or emigrating. To address this, the principal has decided to enhance the administrative capacity of middle management through the middle-level leadership development support program offered by the Quality School Improvement Project (QSIP) in collaboration with a university and school partnership. This program aims to provide continuous professional development opportunities for the middle management team.

In the 2022-23 academic year, X School has been assigned 42 teaching posts.

The majority of teachers (69%) have more than ten years of experience, while a small

percentage (5%) have five to nine years of experience. Teachers with less than five years of experience constitute 26% of the school's staff.

3.2.2 The Second Case: The Y School

3.2.2.1 Background of Y school

Y School is a aided non-religious public estate primary school in the northern part of New Territories West, HK. It uses Chinese as its medium of instruction. The student body mainly consists of underprivileged students. In the 2008-09 academic year, Y School faced termination of government subsidy and closure due to a shortage of P1 enrollment. However, when the serving vice-principal was appointed as the new principal, they saw the implementation of the SCT policy as an opportunity. Under the leadership of the former principal, the school made a remarkable turnaround, regaining its subsidized status and becoming oversubscribed within a few years.

The school's success led to its recognition as an outstanding Inventory Case by the OECD in 2012-13. Y School still practices SCT as part of its policy. It has 26 standard classrooms covering around 1800 square meters, but it is located far from the estate center.

“The location of the school is remote and the popularity is not high”

(The Threat of the SWOT analysis of the Y School, cited from *The Three*

Years School Development Plan 2021-24(p.12)).

The Y School also provides an enriched learning environment and emphasizes the use of SCT to reach students' full potential.

“To extend students' potential development through the provision of an enriched and dynamic learning environment and to adopt SCT and cooperative learning approaches so students can reach their full potential”.

(School Mission of the Y School, cited from *The Primary School Profiles 2022*)

Y School faces tough competition from other primary schools in enrolling P1 students which includes 35 primary schools, all vying for parents' preference in the parental-choice system. Downsizing has been a challenge for the principal of Y School, who has recognized competition among primary schools as a significant threat to the school's development in *The Three Years School Development Plan 2021-24*.

“If parents don't rank this school among the top 10 choices for P1 enrollment, it could lead to low enrollment and affect the establishment of schoolteachers, as well as their morale.”

(The Threat of the SWOT analysis of the Y School, cited from *The Three Years School Development Plan 2021-24*(p.16)).

Y School recognizes the importance of maintaining educational performance to

attract parents and stay competitive. The management team understands the significance of employing KM to improve educational performance for sustainable competitiveness, especially considering the challenges in P1 intake. Since 2018-19, the current principal has emphasized the need to enhance the school's educational performance to be a top choice for quality education-seeking parents. The principal acknowledges that this ongoing challenge requires the collective effort of the entire school community.

Y School aims to utilize KM to improve its reputation among parents and move up the rankings. The goal is to become one of the top one or two schools. To achieve this, the principal emphasizes using KM to optimize the implementation of SCT for enhanced educational performance.

The principal's message has united the school staff in their efforts to improve the school's reputation. Implementing KM, SCT is actively used to enhance teaching and learning quality, catering to individual students' needs and creating an engaging learning environment. This approach has the potential to improve student performance and satisfaction, boosting the school's ranking among parents.

The Primary One Admission (POA) system consists of two stages: "Discretionary Places Admission" and "Central Allocation". The Discretionary Places Quota is determined based on the provisional number of P1 classes.

Under-enrollment of P1 students is a major challenge for schools in the northern part of New Territories West. This is due to declining birth rates, emigration issues, and COVID-19 travel restrictions causing cross-border students to withdraw from HK schools.

“The wave of emigration may lead to a decrease in the number of academically high-achieving students who transfer to other schools. Additionally, due to the tough impact of the COVID-19 pandemic, travel restrictions, and cross-border students’ inability to attend face-to-face classes, some students may withdraw from the school.”

(The Threat of the SWOT analysis of the Y School, cited from *The Three Years School Development Plan 2021-24*(p.16)).

The principal of Y School is visionary and anticipated the problem of under-enrollment of P1 students since the 2019-20 school year when the main trend of HK birth rate declined.

“I always reminded my teaching staff to be aware of the under-enrollment issue, which is a big challenge affecting the school’s survival, and successfully turned it into a shared belief among colleagues”

(Y1)

Under the principal’s leadership, Y School established a special task force for

school promotion to enhance P1 enrollment. The team, led by a young and tech-savvy teacher, includes the principal, three vice-principals, and PSMCD. They played a crucial role in attracting potential P1 parents by promoting the school's enhanced quality through practicing SCT.

Despite challenges, Y School achieved remarkable P1 enrollment results thanks to the success of the task force. During the Discretionary Places Admission stage, the school received 108 parental choices competing for the limited 50 discretionary places quota. In the central allocation period, only parents who selected Y School as their first choice secured a primary school place for the 2023-24 academic year. By adopting KM practices to optimize SCT, Y School significantly improved its reputation among parents, rising to the top 1 position from outside the top 10.

The study confirms that adopting KM practices to optimize SCT can assist Y School educators in navigating the added pressures of P1 intake and education reform challenges, as suggested by Cheng et al. (2017).

“SCT prioritizes student learning, making parents more confident about our school. This increased confidence can benefit the school in the long-term, in terms of student admissions and promotion.”

(Y6)

Y School's 2020 TSA attainment rate in three subjects ranges from 56% to 71%.

Plus, approximately 33% of Y School's graduates have gained admission to English-medium secondary schools in the academic year 2020-21.

The effective implementation of SCT learning circles in Y School since 2018 places the focus on teacher learning, which eventually has a positive impact on student learning. This benefits the school in terms of student admissions, better results in the attainment rate of TSA, and the number of sixth-grade graduates from the school enrolling in secondary schools that offer English classes.

“Since the implementation of SCT learning circles in 2018, our teachers have experienced significant teacher learning, enabling them to better grasp the knowledge of SCT and optimize student learning. Our TSA attainment rates in Chinese, English, and Mathematics have drastically increased by 18% to 28% over the past four to five years. I am confident that the percentage of students entering English-medium secondary schools will rise from 33% in 2021 to more than 50% in 2023.”

(Y1)

The analysis of the documentary review is consistent with the interview data.

“Over 50% of our school's sixth-grade graduates enroll in secondary schools that offer English classes.”

(2022-23 Annual Report of Y School, (p. 22))

3.2.2.2 The principal, middle managers, and teachers of the Y School

Y School's current principal started as PSMCD in 2015-16 and became the principal in 2018-19. Before joining Y School, she was the Prefect of Studies at X School, where she successfully implemented SCT policies and gained 8 years of experience in leading, managing, and evaluating SCT in school.

Having a master's degree in curriculum and instruction, the principal has extensive expertise in curriculum development and educational administration. She has also collaborated on University and School Partnership projects, further enhancing her experience.

Before becoming principal, she taught Math and General Studies as PSMCD. Her three-year tenure at Y School provided her with a deep understanding of the school's traditions, policies, and teachers. With exceptional communication skills and impressive performance, she has built and maintained excellent relationships with middle managers and teachers.

The principal, previously a PSMCD, strongly believes in the pivotal role of middle managers in fostering KM through setting a positive example for teachers.

“Middle managers are essential role models for excellence in teaching practice, with their influence extending across classrooms, teaching teams, and schools.”

(Y1)

The principal of Y School identified a succession concern among middle managers and implemented an effective human resource strategy to transfer leadership responsibilities to other middle managers or groups of middle managers.

“When I took up the position in September 2018, one vice-principal was set to retire in the next few years. With his consent, I transferred his work to potential colleagues to prevent the loss of important school knowledge and he was so kind and agreed to serve as a mentor.”

(Y1)

“With the retirement of senior and middle managers in a few years, the loss of experienced leaders may affect the school’s stability. Therefore, we need to accelerate the professional development of middle-level staff.”

(The Threat of the SWOT analysis of Y School, cited from *The Three Years School Development Plan 2021-24*, (p.16)).

“We aim to pass on the knowledge and skills of the retiring vice-principal to the younger generation, utilizing KM to transfer soft skills to the next generation of school leaders.”

(Y1)

Thanks to a well-executed succession plan, the current principal of Y School has

achieved success. The school now operates seamlessly despite the retirement of a crucial vice-principal and the transition of the PSMCD to a new position as vice-principal of teaching and learning.

“The school successfully carried out personnel replacements, promoting many experienced administrators to top leadership positions and working together to lead the school forward.”

(Strength of SWOT analysis of X School, cited from *The Three Years School Development Plan 2021-24*, (p. 14)).

Y School’s vice-principals have been in their roles for two to three years. The vice-principal of teaching and learning (Y4) was previously the PSMCD before being promoted. All appointments were made internally during the current principal’s tenure.

Under the leadership of the principal, Y School has formed a successful Senior Management Team (SMT) comprising the principal, three vice-principals, and PSMCD. The team functions effectively as an administrative unit, utilizing shared leadership to address succession challenges and the under-enrollment of P1 students.

To strengthen the administrative capacity of Y School’s middle managers, the principal participated in a university and school partnership program offered by QSIP. This program provides ongoing professional development opportunities for middle-level leadership.

The teaching team at Y School demonstrates a more balanced mix of experienced and young professionals. Approximately 49% of teachers have over ten years of experience, while 24% have five to nine years of experience. Around 27% of teachers have less than five years of experience, and the school management highly values the innovative contributions of novice teachers.

“The addition of more young teachers has brought new teaching thinking modes and vitality to learning and teaching.”

(Strength of SWOT analysis of the Y School, cited from *The Three Years School Development Plan 2021-24*, (p. 14))

Y School’s professional development team supports novice teachers through a mentorship program. Novice teachers are assigned a class mentor and a teaching mentor. The class mentor, an experienced class teacher, guides them on class-related matters, while the teaching mentor, an experienced teacher in the same grade level, helps improve their teaching skills. This mentorship approach aims to enhance the involvement and effectiveness of novice teachers in their teaching journey.

“Mentors can gain professional growth themselves through the process of helping newly recruited teachers.”

(*The 2021-22 Annual School Report*, p.7).

3.2.3 Section Summary

This study examines X School and Y School as cross-case studies, which have similar development processes and student backgrounds, but differ in instructional capacity and school ranking of parental choice. While Y School has a steady number of students, X School is addressing the issue of possible downsizing.

3.3 Data Collection Process

This study employs various data collection methods, including semi-structured interviews, documentary reviews, and observations, to investigate the relationship between three-tiered knowledge leadership practices, KM, and SCT implementation. Qualitative methods are advantageous for exploring the perceptual and procedural aspects of these variables.

Data triangulation through multiple sources of evidence enhances the richness, accuracy, and robustness of the findings. The study involves personal interviews with principals, middle managers, and teachers, ensuring structured data collection. Transcribed interviews provide ample materials for further interpretation.

3.3.1 Documentary Review

Documentary review, along with in-depth interviews and observations, is used to investigate three-tiered leadership practices and organizational factors related to knowledge creation and transfer in schools, providing abundant data including records

of activities that cannot be directly observed. It serves as a means of triangulation, complementing interview and observation findings and uncovering conditions that contribute to knowledge leadership practices. Thorough review of relevant documents related to SCT implementation in the two primary schools was conducted.

In this study, documentary review offers several benefits. Firstly, it provides detailed facts and events that can confirm or contradict information obtained from individuals, enabling a comprehensive understanding of leadership practices and SCT implementation in the schools. Secondly, it is a cost-efficient method, particularly when utilizing online sources (Murray & Sixsmith, 2002). Thirdly, it ensures a safer form of data collection compared to interviews, avoiding the potential biases introduced by the “reactive measurement effect” (Marshall & Rossman, 1999).

Moreover, documentary review offers readily available data, with ethical concerns being minimal since most materials are public documents, such as school development plans and reports. The non-reactive nature of existing documents reduces the risk of researcher influence (Momeni et al., 2008).

However, documentary review has limitations. Document availability affects its usefulness. But in the HK context, EDB requires schools to submit School Development Plans (SDP), Annual School Plans (ASP), and Annual School Reports (ASR) for public access on the school website under Regional Education Offices’

(REOs) supervision. Schools are required to submit these documents for public access, ensuring transparency and accountability. Secondly, data taken from documents may lack context, and researchers may selectively extract data to support their interpretations (Appelton & Cowley, 1997; Abbot et al., 2004). By supplementing with interview data can mitigate this issue.

While documentary reviews may have validity and reliability concerns, verifying the information with interview data helps minimize these issues. Besides, School Self Evaluations (SSE) prepared for External School Reviews (ESR) by the Quality Assurance Division (QAD) of EDB validates the documents on school websites to ensure performance. In the HK school context, public documents' validity and reliability are secured.

Despite drawbacks, documentary review is important in the HK context for this study, with suitable documents including SDP, ASP, ASR, evaluations, and internal documents. Formal evaluations or studies of the same "site" can also be utilized (Yin, 1994). The study collected and reviewed documents related to SCT implementation with the consent of the schools, complementing interviews and observations for data analysis. The SECI model, which reveals three-tiered knowledge leadership practices and organizational factors, was instrumental in understanding SCT implementation by principals, middle managers, and teachers, as these practices and factors are not

directly observable. The documentary review took place from November 2022 to October 2023, and soft copies of the documents were collected from school websites or provided by the schools. The reviewed documents are detailed in Table 3.1.

Table 3.1 The List of Documents for Review in this study

X School ⁽²⁾	Y School ⁽²⁾
The School Development Plan 2021-2024	The School Development Plan 2021-2024
The School Annual Plan 2022-23	The School Annual Plan 2022-23
The School Annual Plan 2021-22	The School Annual Plan 2021-22
The School Annual Report 2021-22	The School Annual Report 2021-22
The School Annual Plan 2020-21	The School Annual Plan 2020-21
The School Annual Report 2020-21	The School Annual Report 2020-21
2020July School Focus Inspection Report	2020July School Focus Inspection Report
The School Annual Plan 2019-20	The School Annual Plan 2019-20
The School Annual Report 2019-20	The School Annual Report 2019-20
The School Development Plan 2018-2021	The School Development Plan 2018-2021
The School Annual Plan 2018-19	The School Annual Plan 2018-19
The School Annual Report 2018-19	The School Annual Report 2018-19
The School Development Plan 2015-2018	The School Development Plan 2015-2018
The School Annual Plan 2017-18	The School Annual Plan 2017-18
The School Annual Report 2017-18	The School Annual Report 2017-18
The School Annual Plan 2016-17	The School Annual Plan 2016-17
The School Annual Report 2016-17	The School Annual Report 2016-17
The School Annual Plan 2015-16	The School Annual Plan 2015-16
The School Annual Report 2015-16	The School Annual Report 2015-16
External School Review Report 2009 & 2018	External School Review Report 2009 & 2018
The School Annual Plan 2008-09	The School Annual Plan 2008-09
The School Annual Report 2008-09	The School Annual Report 2008-09
The Presentation slides by the X School on SCT in 2009 and 2011 SCT Seminar	The Presentation slides by the Y School on SCT in 2009 and 2011 SCT Seminar
Lesson Observation Form	SCT Lesson Observation Form
Chinese Language Panel Documents	Chinese Language Panel Documents
English Language Panel Documents	English Language Panel Documents
Mathematics Panel Documents	Mathematics Panel Documents
General Studies Panel Documents	General Studies Panel Documents
IT Panel Documents	IT Panel Documents
SCT Lesson Plans	SCT Lesson Plans
SCT Teaching Materials	SCT Teaching Materials
Lesson Preparation Working Guideline ⁽²⁾	Learning Circle Working Guideline
	SCT Manual
	2018-19 Learning Circle Workshop PowerPoint Slide
	2022-23 Learning Circle Guideline

The study utilizes documentary review and in-depth interviews to evaluate knowledge leadership practices of principals, middle managers, and teachers in implementing KM to facilitate the effective SCT implementation. Triangulating evidence from these sources will yield robust findings on SCT knowledge leadership practices. The examined documents include public documents (e.g., mission and vision statements) and private documents (e.g., SCT teaching manuals and annual reports). Meeting minutes and official memos were also collected with consent.

3.3.2 In-depth Interviews

Based on Yin (1994), interviews are essential in case studies. In-depth interviews explore attitudes, experiences, feelings, perceptions, values, and viewpoints of individuals on issues (Newby, 2010; Cohen et al., 2018). Guion et al. (2001) note that most in-depth interviews are semi-structured. This study conducted structured in-depth interviews with participants from X and Y schools to gather information on the impact of KM in promoting the effective SCT implementation, as well as three-tiered knowledge leadership practices and organizational factors facilitating knowledge creation and transfer.

According to Jamshed (2014), semi-structured interviews involve respondents answering predetermined open-ended questions. These interviews are widely used to conduct in-depth interviews. DiCicco-Bloom & Crabtree (2006) state that semi-

structured interview guide provides a structured outline of questions or topics for the interviewer to explore. Interview guides are beneficial in optimizing interview time by allowing a more systematic and comprehensive exploration of multiple respondents while keeping the interview focused on the desired objectives (Crabtree, 2006). Creswell & Poth (2018) explain that interview guides consist of a core question and several associated questions tied to the central inquiry.

The semi-structured interviews focused on three main questions based on the literature review. Question 1 explores the impact of KM on SCT implementation. Question 2 addresses the three-tiered knowledge leadership practices and organizational factors. Question 3 examines the effects of three-tiered knowledge leadership practices and organizational factors on KM and SCT policy implementation. Probing was used to ask participants for further information on their responses (Legard et al., 2003). The initial questions were reviewed for validity and understandability. Feedback was used to refine the questions resulting in the final version presented in Table 3.2. In-depth semi-structured interviews were conducted with principals, PSMCD, middle managers, and teachers from X and Y schools with informed consent. Invitation letters explained the purpose and risks of the study, and consent forms were sent to the schools. Principals invited teachers with knowledge of KM, SCT, and knowledge leadership practices to participate.

Table 3.2 The Interview Protocol of this Study

<p>1. What do you think the influence of KM on the implementation process of SCT in terms of the positive knowledge behaviors?</p> <ul style="list-style-type: none"> • Knowledge creation • Knowledge transfer <p>2. Please describe your principal/ middle managers/ PSMCD/ teacher's knowledge leadership practices on the positive knowledge behaviors for the SCT implementation in the following aspects:</p> <ul style="list-style-type: none"> • Knowledge vision • Role Model • Teachers' collegial-trust • Teachers' collaborative working culture • Teachers' Learning and School's professional development • School's Infrastructures e.g., Information Technologies • Partners' Support <p>3. What do you think the influence of the above knowledge leadership practices and organization factors on the effective implementation of KM and SCT policy in your school context?</p>
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The study included two primary school principals, vice-principals, PSMCDs, four core subject-panel heads, and four novice teachers from each school. Due to COVID-19 disruptions, interviews were conducted via Zoom meetings. The sample population was selected with permission from the principals, and the list of invited participants was provided by the principals.

At X School, interviews were conducted with one principal, two vice-principals, one PSMCD, one assessment and data analysis manager, four core subject-panel heads (two also served as teaching mentor), and four novice subject teachers.

At Y School, interviews were conducted with one principal, three vice-principals, one PSMCD, four core subject-panel heads, and four novice subject teachers (all core subject-panel heads served as teaching mentor).

Anonymity for the teachers was ensured through the use of codes (See table 3.3).

Invitation letters and consent forms were provided before the interviews to obtain their informed consent. The interviews were conducted via Zoom meetings from June 2021 to July 2022, lasting between 45 minutes to 1 hour and 20 minutes.

Table 3.3 The information of teachers for the interviewees

X School ^a			Y School ^a		
Code ^a	Role ^a	Duration of Interview ^a	Code ^a	Role ^a	Duration of Interview ^a
X1 ^a	The principal ^a	1h 05ms ^a	Y1 ^a	The principal ^a	1h 20ms ^a
X2 ^a	The VP 1 + Mentor ^a	1h 15ms ^a	Y2 ^a	The VP 1 ^a	1h 03ms ^a
X3 ^a	The VP 2 ^a	1h10ms ^a	Y3 ^a	The VP 2 ^a	1h ^a
X4 ^a	PSMCD + Mentor ^a	1h 05ms ^a	Y4 ^a	The VP 3 ^a	1h 05ms ^a
X5 ^a	Middle Manager 1 ^a	1h 06ms ^a	Y5 ^a	PSMCD ^a	1h 07ms ^a
X6 ^a	Chi. Lang. Panel ^a	1h ^a	Y6 ^a	Chi. Lang. Panel + Mentor ^a	55ms ^a
X7 ^a	Eng. Lang. Panel ^a	1h 03ms ^a	Y7 ^a	Eng. Lang. Panel + Mentor ^a	1h 10ms ^a
X8 ^a	Middle Manager 2 + Mentor ^a	1h 05ms ^a	Y8 ^a	Math. Panel + Mentor ^a	1h ^a
X9 ^a	GS Panel + Mentor ^a	1h 15ms ^a	Y9 ^a	GS Panel + Mentor ^a	1h 10ms ^a
X10 ^a	Novice Chi. Lang. Teacher ^a	45ms ^a	Y10 ^a	Novice Chi. Lang. Teacher ^a	55ms ^a
X11 ^a	Novice Eng. Lang. Teacher ^a	45ms ^a	Y11 ^a	Novice Eng. Lang. Teacher ^a	53ms ^a
X12 ^a	Novice Math. Teacher ^a	45ms ^a	Y12 ^a	Novice Math. Teacher ^a	55ms ^a
X13 ^a	Novice GS Teacher ^a	45ms ^a	Y13 ^a	Novice GS Teacher ^a	1h 02ms ^a

The interviews were conducted in Cantonese, the native language of the interviewees, recorded with verbal consent, and transcribed verbatim. The transcriptions were reviewed and revised by the interviewees if necessary.

According to Nicholas et al. (2010), conducting qualitative data collection via

web-based platforms such as Zoom meetings has several advantages, including: (i) cost and time efficiency due to saved travel costs; (ii) providing participants with time and space flexibility to consider and respond to requests for further information; and (iii) enabling deeper reflection on discussed topics, creating a non-threatening and comfortable environment that makes it easier for participants to discuss sensitive issues.

As this study involved semi-structured interviews, the researcher developed an interview guide with a set of topics and questions. However, unlike a structured questionnaire, the interview guide allowed for open-ended responses and was flexible enough to allow the researcher to note and collect data on unexpected dimensions of the topic, following the approach suggested by Bogdan & Biklen (2003). The research interviews primarily followed the interview guide (See Appendix one).

Interview transcripts have a vital role in ensuring that interview content is accessible, engaging, and informative. These transcripts are sent back to the interviewees for validation and endorsement, giving them the opportunity to make any necessary amendments at their discretion.

3.3.3 Non-participant Observations

Qualitative observation involves taking field notes on the behaviors and activities of individuals at the research site, providing firsthand experience with the participants

(Creswell, 2009). In this study, an observational protocol known as “logging data” is used to record information, commonly employed in case studies (Lofland & Lofland, 1995; Creswell & Poth, 2018). However, most planned observations were not able to conduct due to the COVID-19 pandemic. Instead, video lesson recordings were used as a substitute for in-person classroom observations. Two senior and two novice teachers from X School, as well as four novice teachers from Y School, voluntarily provided video recordings of four SCT lessons each. They all were interviewees.

Galton (2010a) observed a decrease in teacher-talk in HK primary classrooms from 73% to 66% during the SCT study. The study conducted systematic classroom observations on eight classroom teaching videos (four from each school) to examine teachers’ and students’ behaviors. It assessed the balance of teacher and pupil talk in three categories: (i) whole-class teacher talk, (ii) teacher talk or listening to a specific student, and (iii) teacher listening when a specific student is in focus. The analysis focused on eight lessons, with data recorded in 30-second intervals. The researcher noted the teacher’s behavior during each interval, allowing for estimating the percentage of time spent talking without focusing on a student, the ratio of conversations with boys and girls, and the extent of conversations with the same or different students. Figures 3.1 and 3.2 provide the lesson observation record forms for X School and Y School.

Fig. 3.1 The Lesson Observation record of X School teacher-talk

Lesson Observation Record of X School teacher-talk

(Part 1: from 0:05 -0:10) Name of the X School teacher: _____ Date: _____

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____

No. of Periods/Duration: single period/35 mins Every 30 second interval

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
2.+Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3.+Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4.+Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5.+Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

(Part 2: from 0:18 – 0:23) Name of the Y School teacher: _____ Date: _____ ↓

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____ ↓

No. of Periods/Duration: single period/40 mins Every 30 second interval[↕]

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

Lesson Observation Record of X School teacher-talk

(Part 3: from 0:25 -0:30) Name of the X School teacher: _____ Date: _____

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____

No. of Periods/Duration: single period/35 mins Every 30 second interval

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

(Overall) Name of the Y School teacher: _____ Date: _____ ↓

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____ ↓

No. of Periods/Duration: single period/40 mins Every 30 second interval[↕]

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

Fig. 3.2 The Lesson Observation Record of Y School teacher-talk

(Part 1: from 0:05 -0:10) Name of the Y School teacher: _____ Date: _____

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____

No. of Periods/Duration: single period/40 mins Every 30 second interval

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
2. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

(Part 2: from 0:18 – 0:23) Name of the Y School teacher: _____ Date: _____ ↓

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____ ↓

No. of Periods/Duration: single period/40 mins Every 30 second interval[↕]

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

Lesson Observation Record of Y School teacher-talk

(Part 3: from 0:30 -0:35) Name of the Y School teacher: _____ Date: _____

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____

No. of Periods/Duration: single period/40 mins Every 30 second interval

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

(Overall) Name of the Y School teacher: _____ Date: _____ ↓

Class: _____ Subject: _____ Module: _____ Unit/Topic: _____ ↓

No. of Periods/Duration: single period/40 mins Every 30 second interval[↕]

Category of teacher behaviour [↕]	1 [↕]	2 [↕]	3 [↕]	4 [↕]	5 [↕]	6 [↕]	7 [↕]	8 [↕]	9 [↕]	10 [↕]	% [↕]
1. Teacher talks to class (no pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
2. Teacher talks/listens to class (boy pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
3. Teacher talks/listens to class (girl pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
4. Teacher talks/listens to class (same pupil in focus) [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]
5. None of the above [↕]	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	% [↕]

Fig. 3.3 The Observational Protocol of the classroom SCT learning process of X School

Length of Lesson Activity: 35 Minutes	
Descriptive Notes	Reflective Notes
General: What are the learning experiences of students concerning 6 principles in SCT classroom?	
See classroom layout and comment about the physical setting at the bottom of this page.	
Curriculum: SCT Learning Objectives	
Pedagogy: Questioning, Pupil Participation Pair/ Group Work, Feedback	
Assessment: Assessment for Learning	
Question to ask: "Are Galton's 6 principles enacted in the SCT classroom context?"	<p>Chalkboard and LED Projector Screen</p> <p>Teacher Chair Computer Desk</p> <p>Sketch of X School Classroom</p>

Fig. 3.4 The Observational Protocol of the classroom SCT learning process of Y School

Length of Lesson Activity: 40 Minutes	
Descriptive Notes	Reflective Notes
General: What are the learning experiences of students concerning 6 principles in SCT classroom?	
See classroom layout and comment about the physical setting at the bottom of this page.	
Curriculum: SCT Learning Objectives	
Pedagogy: Questioning, Pupil Participation Pair/ Group Work, Feedback	
Assessment: Assessment for Learning	
Question to ask: "Are Galton's 6 principles enacted in the SCT classroom context?"	<p>Chalkboard and LED Projector Screen</p> <p>Teacher Chair Computer Desk</p> <p>Sketch of Y School Classroom</p>

Upon request, all teachers who provided classroom observation videos for further analysis were chosen from the list of interviewees. Both principals of X School and Y School have provided a total of eight classroom teaching videos (four lessons from each school, covering each core subject) to examine the classroom instructional behaviors of teachers and learning behaviors of students.

A classroom lesson observational protocol, depicted in Figure 3.3 and Figure 3.4, was utilized to record information during watching the video lesson observations of X School and Y School. The protocol, based on Galton's SCT six principles, incorporated Y School's lesson observation and teacher appraisal form (See Appendix two). It consists of a session header, a section for recording descriptive notes on activities, and a reflective notes section for theme development (Creswell & Poth, 2018). The page is divided between descriptive and reflective notes, including a visual sketch of the classroom setting for additional context.

Observations provided direct insight into teachers' behavior and the context, while interviews contributed valuable descriptions of past events or inaccessible situations (Creswell, 2013). Documentary reviews were used to complement interviews and observations for triangulation, enhancing the study's credibility through the use of multiple sources and methods.

Table 3.4 summarizes the whole process of how and what kind of data were

collected to address the research questions. It illustrates the data collection methods, number of participants, the codes for the data, rationale and analysis approaches in relation to the four research questions. It examines the schools' KM initiatives and assesses the influence of knowledge leadership practices on SCT implementation.

Table 3.4 A brief Summary of the Data Collection Sources and Methods

Instrument	No. of participants	Data	Analysis	
1. In-depth interviews for the principals, middle managers and teachers	X School: 13 1 Principal, 2 vice-principals, 1 PSMCD, 5 Middle Manager (4 of them are core-subject panels) 4 Novice teacher from each core -subject panel Y School: 13 1 Principal, 3 vice-principals, 1 PSMCD, 4 Middle Manager (they are core-subject panels) 4 Novice teacher from each core -subject panel	Semi-structured Audio recorded and transcribed	Thematic analysis via deductive approach	
2. Lesson observations	X: 4 lessons Grade 4: English Grade 4: General Studies Grade 6: Chinese Grade 6: Math Y: 4 lessons Grade 6: English Grade 5: General Studies Grade 3: Chinese Grade 5: Math	Video recorded lessons	Content analysis for application of Galton's SCT six principles	
3. Documentary Review		Documents and lesson plans	Content analysis	

3.4 Data Analysis Process

Creswell & Poth (2018) notes that data collection, analysis, and report writing are interrelated and often occur simultaneously in a research project, rather than as

distinct steps.

3.4.1 Collection and Storage of data

This study will gather raw data, including recorded interviews, field notes, and interview transcripts. The field notes will contain the researcher's initial observations, inquiry questions, and research areas. The interviews will be transcribed and carefully reviewed for accuracy.

To ensure comprehensive data collection, this study will utilize multiple sources of data. Suri (2011) proposed the concepts of “data saturation” and “data sufficiency” as guidance for validating closure and searching for relevant evidence. The study follows Yin's (2014) recommendations for case studies, employing various forms of data collection within practical constraints imposed by the COVID-19 pandemic.

Qualitative research involves four primary types of data collection procedures: audio-visual materials, documents, interviews, and observation (Creswell, 2008). This study incorporates documents, interviews, SCT lesson videos, and observation as part of the data collection procedure. Several principles suggested by Creswell & Poth (2018) regarding data storage and handling have been adopted as good practice for this qualitative study.

These principles include: (i) Creating backup copies of soft files; (ii) Utilizing

high-quality Zoom meetings for video recording during interviews; (iii) Developing a master list of gathered information; (iv) Ensuring participant anonymity by masking their names in the data; (v) Storing any necessary master lists separately; and (vi) Creating a data collection matrix as a visual tool for identifying and locating information in this study.

3.4.2 Field entry

Creswell & Poth (2018, p.147) suggests that the first and most important step in the data collection process is to “find people or places to study and to gain access to and establish rapport with participants, so that they provide good data.” In this study, the relationships created with participants, referred to as “gatekeepers” by Creswell (2013), were crucial for accessing the school settings. Since 2008, the researcher has been a longstanding SCT working partner of X School and Y School, which facilitated entry into these schools. This connection put the researcher in a better position to establish rapport with school principals, middle managers, and teachers. The study’s purpose are explained to the principals, and their written permission is required to conduct the study in the schools.

3.4.3 Data Analysis Process

This cross-case study employs qualitative data analysis to identify thematic

patterns within and across cases (Wolcott, 1994; Creswell & Poth, 2018). Coding is used to assign descriptive labels to data segments, facilitating categorization, retrieval, and condensation of data (Charmaz, 2006; Hutchison et al., 2010; Miles et al., 2014).

The analysis involves searching for patterns and meaning, condensing data, and interpreting them (Spradley, 1980; Miles & Huberman, 1994). Phases in data analysis include note-taking, reflective writing, summarizing, coding, theme reduction, counting, relating categories to literature, and presenting data (Creswell & Poth, 2018).

Creswell (2013) advises that qualitative researchers start data analysis immediately after the first interview or observation and continue while writing reports and papers. In this study, data analysis starts early and continues throughout. The initial analysis is informal, with reflections jotted during interviews and observations. Materials are organized by type with a table of sources aiding organization.

Initially, a provisional list of codes was developed through deductive coding, guided by research questions and existing literature. The data, including documents, interview transcripts, and field notes, were then analyzed to match them with the developed codes. Through regular reviews of notes, the incorporation of school language facilitated an inductive coding process. Using a constant comparison approach, new codes were created, and existing codes were revised based on the data until a final list of codes was represented (See Table 3.5) (Strauss & Corbin, 1990).

This qualitative research analyzed data to answer research questions, grouping interviews, observations, and documents. Coding based on participants' perspectives, grouping similar concepts, and classifying into categories was conducted. Continuously modifying, combining, reorganizing, and creating codes accurately illustrated school experiences.

Creswell & Poth (2018) summarized phases in the data analysis process as follows: (i) Taking notes while reading; (ii) Writing reflective passages in notes; (iii) Summarizing field notes on a summary sheet; (iv) Making metaphors with words; (v) Writing codes and memos to identify codes; (vi) Noting patterns and identifying regularities to reduce codes to themes; (vii) Counting code frequency; (viii) Noting relations among variables and building a logical chain of evidence to relate categories; (ix) Contextualizing categories with literature or an analytic framework; (x) Creating a point of view for senses, audience, and readers; and (xi) Presenting findings in tables, charts, diagrams, and figures; comparing cross-cases or with a standard case.

Takashi (2008), presents a very useful and practical way of data analysis as Step Coding and Theorization (SCAT), which aims to be easily accessible. To begin the “four-step coding”, researcher will assign the following codes in a sequential manner: (i) Noteworthy words or phrases extracted from the text; (ii) Paraphrases of the previously identified words or phrases; (iii) Concepts from outside the text that

correspond to the paraphrases in step (ii); and (iv) Themes and constructs that take the context into account. The subsequent step entails crafting a theory. Once steps (i) through (iv) are completed, researcher utilize the themes and constructs from step (iv) to develop a narrative in the theory writing. Finally, researcher synthesize the story-line to formulate a theory.

The study utilizes both deductive coding, which develops codes based on research questions and literature, and inductive coding, which identifies patterns and themes from the data (Strauss & Corbin, 1990; DeCuir-Gunby et al., 2011; Miles et al., 2014). Miles et al. (2014) define deductive coding as developing a provisional list of codes before fieldwork based on the conceptual framework, research questions, and/or key variables. Auster-Gussman & Auster (2018) describe it as designing a coding scheme from theoretical constructs. Strauss & Corbin (1990) highlight its theory-based approach directed by the researcher's theoretical interest.

Inductive coding involves patterns and themes emerging from the research data. Strauss & Corbin (1990) describe it as a data-driven method that involves intensive analysis to identify relevant categories matching the data. DeCuir-Gunby et al. (2011) state that codes are identified from data for pattern development without pre-designed coding or categorizing schemes. Smith & Joffe (2009) argue that inductive coding reduces theoretical constraints, allows unexpected themes to emerge, and facilitates

finding relationships between constructs.

Fereday & Muir-Cochrane (2006) recommend a hybrid approach that combines deductive and inductive coding for most qualitative research, integrating data-driven and theory-driven codes. In this study, a hybrid approach is used to analyze documentary, interview, and observational data. The final analysis write-up creates themes from the text data to describe participants and settings, answering research questions and understanding how three-tiered knowledge leaders cultivate SCT knowledge creation and transfer. Following Creswell's recommendation for a detailed report, the study focuses on a small number of themes (Creswell , 2008).

3.4.4 Validity in terms of the trustworthiness of the interview

In case study research, the trustworthiness of the data obtained through interviews is a matter of great concern. To address this issue, several strategies are employed to ensure the trustworthiness of the collected data. Firstly, during the interview, the researcher continuously triangulates the data collected from interviews with other sources of data gathered through observation, document analysis, and field study notes. Secondly, the researcher triangulates the data collected from a single interview with data from other interviews conducted in the same case school. Lastly, the researcher makes every effort to ensure the factual accuracy of the respondents'

accounts by acknowledging that much of the accounts are interpretations and constructions of meaning.

3.4.5 Acknowledgement of non-generalizability at this stage

This study does not aim to draw a statistically representative sample. Case studies are criticized for their inability to generalize results (Zainal, 2007). Although generalizability is not the primary focus of this research, Carminati (2018) suggests that generalizability can be achieved in qualitative domains under certain conditions. It is crucial to exercise caution when selecting the philosophy and terminology employed in the research process. The focus of generalizability in qualitative studies lies in the researcher's analysis and comprehension of circumstances, rather than solely on the collection of representative data (Morse, 1999; Delmar, 2010). In this regard, generalization involves making inferences about the potential extrapolations or transferability of the findings. This is achieved by conducting a theoretical analysis of the factors that generate the outcomes and considering the influence of the context. Readers can determine the authenticity of the reported case-specific details and decide how to utilize the knowledge gained from these studies. It is up to readers to act accordingly. This will continue until SECI and KM approaches become widespread enough to undergo extensive comparative analysis.

3.4.6 Ethics

According to Creswell & Poth (2018), a qualitative researcher must face “many ethical issues that surface during data collection in the field and in analysis and dissemination of qualitative reports”. This research is a cross-case study that relies on the school’s documents and reports, as well as sensitive or personal data from the interview respondents. The studies involving human participants were reviewed and approved by Human Research Ethics Committee of EdUHK. Therefore, the study maintained a high ethical standard throughout the investigation process and the dissemination of the qualitative report. Before the study was launched, the researcher obtained prior approval on the ethical review from the Human Research Ethics Committee of EdUHK. During all phases of the research process, the researcher followed the operational guidelines and procedures of the Human Research Ethics Committee. Before retirement, the author served as the Vice-principal of a local subsidized secondary school, and there is no conflict of interest. Participants in this study provided written informed consent to participate.

3.5 Chapter Summary

This cross-case study explores how three-tiered knowledge leadership practices facilitate the use of KM to promote SCT implementation in primary schools, investigating leadership practices and examining their influence on the

implementation of KM and effective SCT implementation using the SECI model as an analytical lens. Qualitative methods such as interviews, observation, and document analysis identify themes between three-tiered knowledge leadership practices, KM, and SCT knowledge creation and transfer. Relying on multiple data sources triangulates and cross-validates information gathered from different perspectives.

Table 3.5 The Final List of Codes

Themes [↵]	Patterns [↵]	Codes [↵]
The influence of KM on the implementation process of SCT in Schools [↵]	The influence of KM on knowledge sharing [↵]	<ul style="list-style-type: none"> • Facilitating the socialization process of SCT knowledge;[↵] • Supporting the creation of experiential/ social knowledge assets;[↵] • Improving teachers' involvement in knowledge sharing;[↵] • Building consensus and validating what is SCT knowledge within school and among teachers through the process of knowledge sharing.[↵]
	The influence of KM on knowledge creation [↵]	<ul style="list-style-type: none"> • Facilitating the externalization process and combination process of SCT knowledge;[↵] • Supporting the creation of conceptual and systemic knowledge assets;[↵] • Improving teachers' involvement in knowledge creation and combination;[↵] • Fostering teachers' commitment to knowledge creation and initiative to SCT implementation.[↵]
	The influence of KM on knowledge transfer [↵]	<ul style="list-style-type: none"> • Facilitating the internalization process of SCT knowledge;[↵] • Supporting the creation of routine knowledge assets;[↵] • Improving teachers' involvement in knowledge transfer;[↵] • Enhancing teachers' mutual learning for effective SCT implementation.[↵]
Three-tiered Knowledge Leadership Practices for	Leadership Practices of principal, middle managers, and teachers [↵]	<ul style="list-style-type: none"> • Centralized principal knowledge leadership roles and practices;[↵] • Situational middle manager knowledge leadership roles and practices;[↵] • Distributed teacher knowledge leadership roles and practices.[↵]



the SCT implementation	Setting school's knowledge vision	<ul style="list-style-type: none"> • Building school knowledge vision; • Communicate the knowledge vision with teachers.
	Role Model of Knowledge Leaders	<ul style="list-style-type: none"> • Serving as a role model for followers in the learning process; • Being mentors and role models for KM in practices.
	Promoting teachers' collegial-trust	<ul style="list-style-type: none"> • Relational leadership; • Providing psychological safety.
	Cultivating teachers' collaborative working culture	<ul style="list-style-type: none"> • Promoting collaborative lesson preparation in the school; • Promoting SCT learning circles in the school.
	Promoting teachers' learning and school's professional development	<ul style="list-style-type: none"> • Facilitating teachers' professional development on SCT in Galton's six principles (i.e., supporting teachers' study in SCT training programs, arranging SCT professional development activities in school, internal SCT experience sharing, delivering talks and personal sharing on SCT to teachers, and SCT teacher appraisal and assessment mechanism); • Serving as role model for teachers' SCT learning.
	Building school's infrastructure e.g., information and communication technologies (ICT)	<ul style="list-style-type: none"> • Making use of IT for effective SCT knowledge storage and retrieval; • Building physical and virtual Ba.
	Seeking partners' support	<ul style="list-style-type: none"> • Building partnerships with external parties; • Gaining supports (i.e., training, professional development, consultation, and experience sharing) from partners.
The influence of the	The influence of setting school's knowledge vision	<ul style="list-style-type: none"> • Making SCT knowledge sharing, creation, and transfer essential to the school development;



Knowledge Leadership Practices and Organizational factors on the implementation of SCT in Schools↵		<ul style="list-style-type: none"> • Making SCT knowledge storage essential to the school development.↵
	Role Model of Knowledge Leaders	<ul style="list-style-type: none"> • Serving as a role model for followers in the learning process;↵ • Being mentors and role models for KM in practices.↵
	The influence of promoting Teacher collegial-trust↵	<ul style="list-style-type: none"> • Relational leadership practices;↵ • Teachers are willing to take a bit forward for risk taking in the process of SCT knowledge sharing, creation, and transfer.↵
	The influence of cultivating teachers' collaborative working culture↵	<ul style="list-style-type: none"> • Collaborative lesson preparation: Improving the communications among teachers;↵ • LCs: Making SCT knowledge sharing, creation, and transfer more comprehensive and systematic.↵
	The influence of promoting teachers' learning and school's professional development↵	<ul style="list-style-type: none"> • Fostering teachers' belief in the necessity of SCT knowledge sharing, creation, transfer, and knowledge storage;↵ • Developing teachers' skills for effective SCT knowledge sharing, creation, transfer, and knowledge storage.↵
	The influence of building school's infrastructure e.g., information and communication technologies (ICT)↵	<ul style="list-style-type: none"> • Enabling to identify and develop functions in IT for effective SCT knowledge storage and retrieval;↵ • Enabling originating Ba, dialoguing Ba, systemizing Ba, and exercising Ba for SECI mechanism to operate. ↵
	The influence of seeking partners' support↵	<ul style="list-style-type: none"> • Enhancing KM capacities that helps effective SCT knowledge sharing, creation, transfer;↵ • Introducing the SCT concept and helps effective SCT knowledge storage and retrieval.↵



CHAPTER 4 FINDINGS & DISCUSSIONS

This chapter presents study findings where principals, middle managers, and teachers acted as knowledge leaders, engaging in KM initiatives to facilitate effective SCT implementation.

This study identified three-tiered knowledge leadership practices and organizational enabling factors that institutionalized the SECI KM model for SCT knowledge creation and transfer. Crucial factors included the school's knowledge vision, a role model of knowledge leaders, collegial trust level, teacher collaboration culture, administrative arrangements and ICT usage, professional development opportunities and appraisal and assessment mechanisms, and external partner support.

This study emphasizes the significance of three-tiered knowledge leadership practices and organizational factors in promoting the SECI KM model for SCT implementation. By addressing factors that impact knowledge creation and transfer, educators can create a positive environment supporting ongoing knowledge creation and transfer, and sustainable school growth. These findings reinforce and extend Chapter 2's literature review.

4.1 The case study of X School

4.1.1 The Influence of KM on the implementation process of SCT in X School

The study's first research question concerns the influence of the KM implementation process of SCT in the school context. Cheng (2019a) concluded that

organizations can use codification and personalization strategies to align explicit knowledge resources and tacit knowledge capability, improving organizational performance, based on Zack's (1999) academic study.

Schools use codification strategies to transform tacit knowledge into explicit knowledge, facilitating knowledge flow. Studies show the positive influence of KM on SCT implementation through codification strategies, as in X School. Personalization strategies involve a teacher-to-teacher approach, delivering customized educational services for unique contexts and instructional problems.

4.1.1.1 X School Teachers' and Principal's perception of KM in their Own Unique School Context

At X School, X1 employed KM practices, such as a record management system, to ensure the quality, reusability, and retrieval of KM knowledge records, thereby preventing the loss of school knowledge assets when these teachers leave the school as suggested by Cheng (2019a). X1 plays a vital role in establishing, maintaining and storing organizational knowledge, which aligns with the findings of Klenke (1994).

“We learnt a lesson from the lost SCT knowledge after the PSM with that knowledge leave our School”.

(X1)

Cheng (2019a) stated that effective record management ensures KM record

authenticity and contextual information, enabling meaningful interpretation and application of explicit knowledge. X School primarily utilizes a record management system as the codification strategy to maintain SCT records and collaborative lesson preparation as the primary personalization strategy for sharing SCT knowledge.

“In terms of KM, X School is committed to uploading all school documents, data, and teaching materials to the school server.”

(X1)

“The principal requested optimization of meeting minutes and subject teaching material management in the KM system.”

(X2)

“The school values the experiences accumulated during the suspension of classes and actively plans to develop a KM system. It systematically organizes and stores the experiences and materials related to teaching and learning, as well as student support work, for teachers to share.”

(The 2020 Focus Inspection Report (QAD,EDB) of X School, p.4).

In X School, Focus Inspection Report revealed that the school utilized a codification strategy, adopting the KM system as a record management system to capture, codify, diffuse, and share knowledge within the school’s context. The school uses codification strategies to transform SCT tacit knowledge into SCT explicit

knowledge, thereby facilitating SCT knowledge flow. KM means the capturing and reusing knowledge to improve school performance and save time and effort (Cheng, 2019a). This aligns with X School's perception of KM, but a senior teacher expressed a different view, stating that the school didn't give enough importance to KM.

“I don't see any particular emphasis or visible work in the school's KM area under the previous principal.”

(X8)

The loss of the SCT knowledge asset was evident when the PSM, the original prefect of studies and chairperson of the SCT task force, left School X. She had comprehensively reviewed the school's SCT experience and wrote the SCT teaching manual for X School.

“The former PSM established a complete SCT KM system with a written teaching manual on Galton's six SCT principles. However, the SCT KM system was no longer in use after the colleague's departure.”

(X3)

The departure of the SCT knowledge leader as a significant middle manager negatively impacted School X's SCT implementation effectiveness. The former principal failed to retain the SCT task force operation or update the SCT teaching manual, resulting in knowledge loss. Cheng (2019a) emphasizes the importance of

effective KM for knowledge retention. It is urgent to institutionalize the KM mechanism in schools to prevent knowledge loss from teacher turnover.

X School's knowledge vision is not in alignment with the SCT philosophy and is not widely known among novice teachers, which could negatively impact the implementation of both KM and SCT. The knowledge leadership practice of the X1 does not align with the research findings of Zack (1999) and Cheng (2013b), which emphasize that establishing a vision is a crucial success factor for implementing KM in schools.

“The school should have a clear knowledge vision for its development, but novice teachers are often unaware of it as it's not frequently discussed.”

(X2)

“I don't understand the knowledge vision as a direction for school development because we haven't discussed it.”

(X13)

4.1.1.2 The Influence of Codification KM Strategies on reviewing SCT endeavors last

15 years in X School

X School made significant progress in SCT through collaborations with experts from HK and mainland China, as shown in Table 4.1. X1 use codification strategy to keep school's past 15 year's SCT endeavors since 2008.

Table 4.1 Past 15 year's SCT endeavors of X School since 2008

Year ^(a)	Program ^(b)
2008-2009 ^(a)	X School was selected by the HKIEd as one of the three pilot schools for SCT in Hong Kong. ^(c)
September 2008 ^(a)	X School established a "Small Class Teaching Working Group" in September 2008, which clearly defined its scope of work and formulated policies for SCT. ^(c)
October 2008 ^(a)	A professional development workshop on the how to promote SCT was held. ^(c)
October 2009 ^(a)	X School has been invited by the HKIEd to participate in the "Small Class Teaching Leadership Collaboration Program" as a core member (there are ten schools invited in Hong Kong). ^(c)
2009 ^(a)	Professional exchange activities for small class teaching were held, and school administrators from Nanjing visited X School. ^(c)
2010 ^(a)	The Greater China Small Class Teaching Forum organized by HKIEd visited X School and conducted class observations. ^(c)
2011 ^(a)	An English expert from Nanjing Education Bureau visited X School. ^(c)
October 2011 ^(a)	Members of the five-week small class curriculum English team of the HKIEd visited X School. ^(c)
February 2012 ^(a)	Members of the five-week small class curriculum English team of the HKIEd visited X School. ^(c)
March 2012 ^(a)	Members of the five-week small class curriculum Mathematics team of the HKIEd visited X School to share experience in SCT. An English expert from Nanjing Education Bureau also visited X School. ^(c)
March 2013 ^(a)	Members of the five-week small class curriculum English team of the HKIEd visited X School. ^(c)
May 2014 ^(a)	An English expert from Nanjing Education Bureau visited X School. ^(c)
2016-2019 ^(a)	X School participated in the "Communities of Practice to Optimize Small Class Teaching Support Program" to enhance effectiveness of SCT. ^(c)

"Implementing a KM system enables the accumulation and inheritance of intellectual assets in a school. In other words, it allows for the accumulation of experience."

(X1)

X School has implemented a File Management System (FMS) as a KM system to adopt the codification strategy. This system stores and retrieves SCT documents while analyzing them using data mining methods, which is consistent with the findings of Cheng & Chu (2018).

"The IT committee had developed an FMS platform."

(2021-22 Annual report of IT Committee of X School, (p.1)).

The codifying strategy of KM can aid schools in reviewing and analyzing SCT documents through a KM system. This system facilitates the preparation and retrieval

of SCT records, as well as their analysis for SCT implementation, thereby promoting improved learning and teaching in the SCT classroom. According to Cheng & Chu (2018), record systems serve the same purpose.

4.1.1.3 The Key Personalization Strategies that were used to implement KM in the X

School

Sveiby (2001) suggests that codification is an information technology-oriented strategy, while personalization is a people-oriented strategy. X School attempted to use both personalization and codification strategies to leverage SCT knowledge for development.

In the 2018-21 Three Years School Development Plan, X School aimed to provide a stimulating learning environment that nurtures students' holistic and moral development. Additionally, the school aimed to enhance the effectiveness of teaching and learning by implementing a catering for learning diversity policy.

X School utilized collaborative lesson preparation as a personalization strategy to facilitate the sharing of SCT knowledge which aligns with the findings of Ho et al. (2012) that personalization entails exchanging tacit knowledge among teachers through face-to-face interaction, such as sharing teaching experience, ideas, and insights.

Cheng (2019a) stated that any lesson-preparation meeting that fosters knowledge

sharing can be considered a personalization strategy. X School employed collaborative lesson preparation meetings as a personalization strategy which is consistent with the finding of Cheng et al. (2017) that personalization involves knowledge retrieval, sharing, and utilization processes.

Collaborative lesson planning, employed as a personalization strategy in KM, was reported by novice teachers at X School to be beneficial.

“Collaborative lesson preparation provides opportunities for teachers to discuss lesson plans together, allowing novice teachers easier to retrieve documents and learn from experienced teachers in their teaching.”

(X11)

The personalization strategy of KM can aid X School in making SCT strategic choice during policy implementation, particularly for novice teachers. Collaborative lesson preparation was used by X School teachers to enhance their teaching and learning. The objective and procedural details of this strategy are outlined in the school documents.

The aim of collaborative lesson preparation of X School is:

“Teachers collaborate to address students’ learning difficulties, propose solutions, optimize unit teaching designs, enhance learning effectiveness, and promote professional development.”

(Collaborative Lesson Preparation Working Guidelines of Curriculum and Instruction Department of X School, (p.1))

The implementation details of collaborative lesson preparation are as below:

“The implementation of collaborative lesson preparation involves subject grade level coordinator teachers in Chinese, English, Math., and General Studies leading the meetings.”

(Collaborative Lesson Preparation Working Guidelines of Curriculum and Instruction Department of X School, (p.3))

X School teachers used collaborative lesson preparation to address students’ learning difficulties, set learning goals, tailor content, and adopt appropriate teaching strategies for effective classroom teaching.

“I prioritize SCT collaborative lesson planning to accumulate experience in SCT intentionally.”

(X1)

X School primarily employed collaborative lesson preparation to improve teaching and learning and optimize SCT implementation.

“Currently, it is not feasible to optimize the collaborative lesson preparation due to inadequate middle manager’s force in classroom observation and evaluation quality.”

(X1)

X School has room for improvement in the collaborative lesson preparation implementation process. The system is not yet well-established, and teachers need more time and space to improve. Additionally, establishing middle-level leadership is necessary to enhance the effectiveness of collaborative lesson preparation at X School as some teachers take it as “usual practice”. The situation is consistent to the finding of Cheng & Lee (2020) that taking these practices as “usual practice” negatively affects their effectiveness.

“The collaborative lesson preparation system at our school is not yet fully established. To improve its effectiveness, we have joined QSIP and are developing middle-level leadership.”

(X1)

“The collaborative lesson preparation system is not yet well-established and some teachers take it as usual practice.”

(X3)

“Collaborative lesson preparation requires space, and teachers may not have enough time or resources to execute it effectively.”

(X7)

“I have observed some collaborative lesson preparation that is solely

administrative and lacks professional discussion.”

(X8)

“The school can further build a learning community within the school, sustaining a culture of teacher sharing, regular exchanges, mutual learning, and leveraging collaborative lesson preparation to enhance overall work efficiency.”

(The 2020 Focus Inspection Report (QAD,EDB) of X School, p.4).

4.1.1.4 The lack of mastery of Galton’s SCT six principles in X School’s classroom

The following sections are about the lack of pedagogy in X School that has hindered the effectiveness of the SCT implementation. X School is not successful in enhancing novice teachers’ skills and leveraging Pedagogical Content Knowledge (PCK) due to the ineffective KM leadership (See 4.3.1.2 and 4.3.1.3).

4.1.1.4.1 In terms of the balance between teacher talk and pupil talk

Galton (2015a) emphasizes the importance of the six SCT principles and notes that there has been a concentrated effort to improve SCT teaching and learning, particularly with the introduction of small classes in HK primary schools.

Systematic classroom observation analysis revealed that in X School, the average percentage of lesson observation when no pupil was in focus was 66%.

During this time, students listened to teacher talk, watched demonstrations, recited

writing, or worked on tasks while the teacher monitored the activity. In a 35-minute period, only 11.9 minutes were available for individual attention, amounting to 28.56 seconds per student in a class of 25.

Cluster analysis identified four types of teacher behaviors in X School classrooms:

- Type 1 (18%): individual/ pair sustained enquirers
- Type 2 (16%): group task monitors
- Type 3 (42%): Whole class instructors
- Type 4 (24%): Whole class questioners

Novice teachers (X10 and X12) in X School had an average of 85% observation when no pupil was in focus, while experienced senior teachers had an average of only 47% (See Appendix three). The average percentage of observations when no student was in focus aligns with interview findings.

“Teachers rarely allow students to express their thoughts and typically impart knowledge directly.”

(X5)

“Classroom instruction is generally teacher-centered, with few opportunities for students to express themselves.”

(X11)

There was a significant difference in the average percentage of observations where no student was the focus between senior (X3 and X9) and novice teachers (X10 and X12) at X School (See Appendix three), suggesting the need for improvement in SCT tacit knowledge socialization and internalization processes as the collaborative lesson preparation system is not well-established. The KM leadership of X School can not successfully build a SECI KM model within the school so as to sustain a culture of SCT knowledge sharing, regular exchanges, mutual learning, and leveraging collaborative lesson preparation to enhance overall SCT implementation. Interview analysis supports the lesson observation findings.

Novice and senior teachers in X School socialize SCT knowledge and share teaching tips to convert tacit knowledge to explicit knowledge through discussion and text. However, the integration of individual and group-specific SCT knowledge into school-wide integration is less common.

“There is still some socialization of SCT knowledge and sharing of teaching tips among novice and senior teachers, as well as some sharing that turns SCT tacit knowledge into explicit knowledge through discussion and text. However, when it comes to integrating individual subjects and other subject into a school-wide integration of group-specific SCT knowledge into school SCT knowledge, there seems to be less of that.”

(X 7)

4.1.1.4.2 *The mastery of Galton's six principles in terms of the interviews result*

Interviews revealed that teachers at X School have room for improvement in comprehending and applying Galton's six SCT principles in their classroom practices due to the turnover of senior teachers and the recruitment of novice teachers who have not undergone SCT professional training.

“Classroom observations indicate that only around one-third of experienced teachers are performing well.”

(X4)

“Sorry, I don't know what is the six principles.”

(X10)

4.1.1.4.2.1 *In terms of the Clear Statement Learning Objectives*

The first principle to enhance SCT practice is a clear statement of learning objectives for SCT lessons, with most teachers agreeing that they can specify the objectives in interviews.

“In terms of teaching objectives, they are clear for every class.”

(X3)

X School teachers can generally communicate learning goals and objectives at the start of lessons. However, they may not review them before the end of the lesson

to evaluate student comprehension, which concerns the two vice-principals as teachers may only list learning objectives during observation but not during regular teaching.

“Novice teachers may forget to consolidate lessons, which concern me as they may only list learning objectives during observation but not during regular teaching. This may lead to such a situation.”

(X3)

4.1.1.4.2.2 In terms of the Extended Questioning during Whole-class

Discussions

The second principle to enhance SCT practice is to include extended questioning during whole-class discussions. While most interviewed teachers agree they can use questioning techniques, time constraints often limit extended discussions. Some teachers may struggle with questioning techniques, limiting their questioning to the knowledge level only. The results are consistent to the findings of (EDB, 2010a) that teachers need additional time for planning, reflection, and evaluation of their SCT classroom practices.

“To keep up with the teaching schedule and complete content quickly, we tend to use fewer techniques, such as follow-up or counter-questions, to prompt extended questioning during class discussions.”

(X11)

“Some teachers ask shallow questions that lack depth and are unfamiliar with follow-up questioning.”

(X4)

4.1.1.4.2.3 In terms of the more Active Pupil Participation

The third principle for enhancing SCT practice is to increase active student participation. According to X2, “While student participation is crucial, our students’ level of participation is average”. In an effort to improve this, teachers at X School are attempting to organize more classroom activities to encourage greater student engagement. However, there may be a misalignment between the learning objectives and the activities implemented, as well as a lack of consolidation and reflection on group tasks.

“Teachers may design learning activities that do not align with lesson objectives.”

(X4)

“Some teachers forget to thoroughly debrief after completing an activity, which is crucial for helping students construct knowledge and consolidate learning.”

(X5)

4.1.1.4.2.4 In terms of the Increased Cooperation between Pupils through

Working in Pairs and Groups

The fourth principle to enhance SCT practice is to promote cooperation among students through pair and group work. Teachers can assist students in creating their own rules for working together, reaching a consensus, and evaluating task completion effectiveness. X School teachers have attempted to incorporate pair and group work, but some were poorly managed with unclear instruction and lacked sufficient challenge. Also, some tasks could be completed individually which aligns with the findings of Galton & Pell (2009) that the main weakness of teachers is the inappropriate use of group work. Besides, time constraints are a significant obstacle, as group work cannot be sustained within a thirty-five-minute lesson.

“Some novice teachers only introduce pair and group work during lesson observations, indicating a lack of regular practice. If students struggle to cooperate and complete small group activities, it may suggest infrequent implementation by novice teachers.”

(X3)

4.1.1.4.2.5 In terms of the Less use of Corrective Feedback and More use of

Informing Feedback

The fifth principle for enhancing SCT practices is to provide feedback that helps

students review their work, correct mistakes, and develop problem-solving skills as self-regulated learners. At X School, teachers provide feedback to students, but there is inconsistency in its effectiveness. Only a small number of teachers are able to use feedback effectively to enhance student learning. There is room for improvement in providing informative feedback that supports students throughout the learning process, rather than solely focusing on corrective feedback. X School should prioritize feedback that enables students to identify their own mistakes, rather than solely relying on being told what errors they made.

“Feedback is mediocre, leaving students uncertain about whether they are right or wrong and why they made mistakes. Colleagues should focus on improving feedback provision.”

(X3)

4.1.1.4.2.6 In terms of the More use of the Assessment for Learning approach

The sixth principle for enhancing SCT practices is to establish a comprehensive learning assessment framework that incorporates both summative and formative assessments, with a focus on Assessment for Learning (AfL). At X School, the implementation of AfL is limited, as the emphasis is primarily on summative assessments for evaluation purposes. To better support continuous student learning and growth, there is a need to enhance the use of formative assessments with AfL.

“The performance in AfL is not ideal.”

(X4)

“Our teachers lack strength in implementing AfL.”

(X3)

4.1.1.4.3 In terms of the Classroom Observations and Documentary Analysis

In terms of documentary analysis, differences exist between novice and senior teachers in their performance in SCT teaching at X School.

“Due to the differences in background and teaching experience between the novice teacher and the experienced teacher, there are differences in their grasp of teaching design and performance in teaching.”

(2022-23 Annual Report of X School, (p. 13))

In terms of the two novice (X10 and X12) and two senior (X3 and X9) teachers’ classroom observations, the application of Galton’s six SCT principles in X School’s classroom were as follows:

4.1.1.4.3.1 In terms of the Clear Statement Learning Objectives

Improving SCT practice requires clear articulation of learning objectives. At X School, senior teachers demonstrate the ability to specify objectives clearly, whereas novice teachers tend to use vague terms. Novice teachers (X10 and X12) often focus on lower-level objectives while neglecting process objectives, resulting in a heavy

reliance on written testing as the sole assessment method. Conversely, senior teachers (X3 and X9) prioritize higher-level objectives and establish success criteria for fostering self-regulated learning. While all teachers communicate learning goals, only senior teachers review them at the end of the lesson. To support novice teachers in setting clear and meaningful objectives that align with higher-order thinking skills and self-regulated learning, X School should provide guidance and training.

The findings from documentary analysis were consistent with the classroom observation results.

“Teachers commonly show students the objectives of the lesson at the beginning of the class. However, some teachers only display the teaching procedures.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

4.1.1.4.3.2 In terms of the Extended Questioning during the Whole Class Discussion

Improving SCT practice includes incorporating extended questioning in whole-class discussions. However, novice teachers (X10 and X12) at X School face challenges in this aspect. They tend to use short waiting times and closed factual questioning strategies, sometimes answering their own questions, which results in student disengagement. In contrast, senior teachers (X3 and X9) at X School explore students’ ideas before instruction, encourage participation, and provide thoughtful

responses aligned with higher-level objectives. Novice teachers may feel constrained by time, limiting the potential for meaningful discussion. To enhance their skills, they should develop techniques that foster extended and meaningful discussions, allowing for thinking time and employing differentiated questioning to cater to diverse learners. X School should provide guidance and training to support this improvement.

The findings from documentary analysis were consistent with the classroom observation results.

“The teacher’s questioning primarily focuses on assessing students’ knowledge and maintaining their concentration, with less emphasis on catering to students of different abilities through different levels of questions.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

4.1.1.4.3.3 In terms of the More Active Pupil Participation

Improving SCT practice requires enhancing active student participation. Novice teachers (X10 and X12) at X School may struggle to align classroom activities with objectives and provide sufficient hands-on opportunities, resulting in low student engagement. On the other hand, senior teachers (X3 and X9) effectively provide clear instructions, encourage active participation, and contextualize tasks meaningfully. They also demonstrate positive expectations for student learning. To increase active

participation, novice teachers can adopt strategies like incorporating hands-on learning, using positive language, and situating tasks in familiar contexts. X School should offer guidance and training to support novice teachers in implementing these strategies effectively.

The findings from documentary analysis were consistent with the classroom observation results.

“In terms of group activities, students generally lack the habit of discussing with their peers and tend to complete tasks individually.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

4.1.1.4.3.4 In terms of the Increased Cooperation between Pupils through Working in Pairs and Groups

Improving SCT practice includes promoting student cooperation through pair and group work. Novice teachers (X10 and X12) at X School may struggle with this aspect, while senior teachers excel by giving clear instructions, assigning challenging tasks, and reinforcing cooperation rules. Senior teachers (X3 and X9) successfully engage most students for a significant portion of the learning time, fostering greater cooperation. To enhance student cooperation, novice teachers should develop strategies such as providing clear instructions, assigning challenging tasks, and reminding students of cooperation rules. X School should offer guidance and training

to support novice teachers in implementing these strategies effectively.

The findings from documentary analysis were consistent with the classroom observation results.

“The design of group learning activities lacks strong collaborative elements and sufficient space for discussion. Additionally, unclear instructions from the teacher and the underutilization of peer collaboration hinder the effectiveness of working together.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

4.1.1.4.3.5 In terms of the Less use of Corrective Feedback and More use of

Informing Feedback

Improving SCT practice involves giving feedback that promotes self-regulated learning. Novice teachers (X10 and X12) at X School often provide corrective feedback and rely on teacher talk without offering timely or specific feedback. In contrast, senior teachers (X3 and X9) create opportunities for student presentations and provide informative feedback, acknowledging effort and success while helping students identify and rectify mistakes. To foster self-regulated learning, novice teachers should provide prompt and specific feedback, encourage self-evaluation and peer feedback, and recognize effort and achievements. X School should provide guidance and training to support the implementation of these strategies.

The findings from documentary analysis were consistent with the classroom observation results.

“Only a small portion of teachers effectively guide and follow up with appropriate feedback, assisting students in mastering the learning content.

However, overall, teachers provide limited specific feedback.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

4.1.1.4.3.6 In terms of the More use of the Assessment for Learning approach

Improving SCT practice involves creating a framework for assessing learning through both summative and formative assessments, with a focus on AfL. Novice teachers (X10 and X12) at X School rely mostly on summative assessments, with weak emphasis on AfL, while senior teachers (X3 and X9) engage students in peer-feedback and self-reflection, supporting self-regulated learning. X School needs to strengthen its use of AfL, providing timely feedback, promoting peer-feedback and self-reflection, and aligning assessments with learning objectives which is consistent with the findings of Galton (2015a) that schools should encourage teachers to devote more effort to providing feedback and implementing AfL practices.

The findings from documentary analysis were consistent with the classroom observation results.

“In classes where there are summaries, it is common for the teacher to

conclude. However, some of these summaries are rushed and fail to effectively encourage students to reflect on what they have learned.”

(The 2018 External School Review Report (QAD,EDB) of X School, p.6).

The use of KM under the guidance of knowledge leadership only partially enabled the SCT policy implementation at X School. The findings indicated partial success due to the ineffective KM knowledge leadership. X School could not promote the culture of SCT knowledge sharing and was not successful in nurturing *Ba* for the effective operation of SECI SCT knowledge creation and transfer process. X School excels in documenting lesson plans and teaching materials for the Externalization of SCT pedagogies. However, the evidence presented above indicates that some of the X School novice teachers are unable to effectively demonstrate SCT pedagogies in classroom practice, suggesting that their tacit knowledge is not adequately shared and combined for broader use in other subjects. Consequently, there is a need for improvement for better knowledge leadership in the Socialization, Combination, and Internalization stages of the SECI model, as problems may arise during these stages when implementing SCT pedagogies.

4.1.1.5 The lack of maturity of SECI spiral process of SCT knowledge creation and transfer in X School

This study used the SECI model to explain how schools create, transfer, and

recreate tacit and explicit SCT knowledge through four modes of knowledge conversion.

4.1.1.5.1 The Socialization process that enable the individual teachers to share their

SCT tacit knowledge through Socialization in X School

The socialization process is facilitated by creating physical or virtual *Ba* for teachers' interaction. Facilitating successful socialization of tacit knowledge is crucial for X School to facilitate SCT implementation.

“With many new colleagues in recent years, it’s essential to share SCT knowledge with novice teachers through socialization. However, there are relatively few opportunities for interactive sharing.”

(X8))

Teachers at X School enhance their teaching and learning by using collaborative lesson preparation. They promote sharing of SCT tacit knowledge through social sharing and voluntarily mutual classroom observations within subject panel.

“Observing actual classroom lessons is an effective way to support novice teachers. Subject panel’s sharing and classroom observation are the primary ways of learning.”

(X10)

Although there have been some improvements, there is still room for progress in

the school system's lesson preparation. The school faces challenges in providing adequate space, an effective support system, and a monitoring system to enhance the efficiency and effectiveness of collaborative lesson preparation.

“Good lesson preparation requires sufficient space and an effective support system, which has not yet been established at the school. I can only say that it has not yet taken shape in that regard.”

(X1)

“The school needs to take more active measures in supervision regarding the lesson preparation system.”

(X3)

Novice teachers appreciate the mentoring system, especially for acquiring SCT tacit knowledge, not easily available through formal PDGE courses.

“Tacit knowledge of SCT cannot be learned solely through studying. Observing my mentor's class taught me how to explain step-by-step and guide students' thinking and learning through activities.”

(X13)

This study confirms that knowledge of SCT teaching is mainly tacit by nature which is aligning with the argument of Cheng (2019a). SCT tacit knowledge is mainly shared through observation, imitation, and practice, rather than solely through

language which is consistent to the findings of Yeh et al.'s (2011) research.

“In terms of sharing SCT experiences from senior teachers, sometimes the most important SCT tacit knowledge cannot be transmitted through words. Senior teachers can demonstrate SCT knowledge in the classroom, observed by novice teachers.”

(X4)

X4 shared a recording of her Chinese language classroom during a session as a personal voluntary measure. This measure could promote the socialization of SCT tacit knowledge among novice teachers through classroom clips.

“Showing classroom clips to new colleagues are a good way to promote socialization and help them grasp SCT tacit knowledge, enabling them to handle the topic more effectively.”

(X4)

X1 introduced a coffee machine to encourage coffee breaks, providing a physical space that promotes informal conversations and social connections among colleagues. These breaks enhance teachers' sense of belonging and create opportunities for knowledge sharing.

“During coffee breaks, my panel discusses common learning difficulties with me, allowing me to learn SCT tacit knowledge effectively through their experiences.”

(X11)

In X School, the administrative arrangement such as assigning experienced teachers of the same level or subject to be mentor and share SCT tacit knowledge with novice colleagues facilitated socialization of SCT tacit knowledge. X4 expects panel heads to enhance the process of transferring SCT tacit knowledge from senior teachers to novice teachers. The findings of this study support the research by Tan (2015), which highlights the significant role of both formal and informal mentoring in the socialization of novice teachers into the teaching profession.

“My mentor shared SCT tacit knowledge, not easily explained in words, through classroom videos for observation and imitation. This experience highlights the importance of having a mentoring system for novice teachers.”

(X10)

Experienced teachers' ability to share SCT tacit knowledge with novice colleagues depends on the effectiveness of the form subject coordinator in collaborative meetings. Socialization is achieved through the coordinator's performance, and successful exchange of teaching experiences in collaborative lesson preparation meetings relies on the coordinator's consistent effort. This aligns with Capel's (2007) argument that knowledge gathering often occurs through education or

informal interactions with others.

“Novice teachers learn tacit knowledge from experienced teachers, relying on the form subject coordinator to function effectively in collaborative meetings.”

(X8)

Knowledge hiding in X School had a negative impact on socialization process, involving sharing SCT tacit knowledge among colleagues. This finding aligns with the argument of Gerpott et al. (2020) that knowledge sharing is discretionary and teachers may see benefits in keeping knowledge to themselves. Addressing knowledge hiding in X School is crucial as it represents another aspect of the same coin as promoting knowledge sharing. Knowledge hiding refers to withholding or concealing knowledge that is requested by another person (Connelly et al., 2012). In the X School, it leads to individual teachers contributing less to school knowledge, harmful to sustainable school development.

“Some senior teachers fear sharing tacit knowledge, fearing it may harm their job security especially when school may experience shirking classes in the near future.”

(X9)

4.1.1.5.2 *The Externalization process that facilitate subject teachers to externalize*

their SCT tacit knowledge into subject level explicit knowledge through Externalization in X School

In X School, externalization, which is the process of articulating tacit knowledge into explicit concepts, is crucial for effective knowledge creation and transfer. This aligns with Farnese et al.'s (2019) findings.

“To facilitate externalization, detailed records of collaborative lesson preparation meetings will be documented and distributed to all teachers as reference material.”

(X1)

At X School, teachers externalized their SCT knowledge using the tacit-to-explicit mode, articulating SCT tacit knowledge into subject level SCT explicit knowledge through dialogue and recording it as text as suggested by Nonaka & Takeuchi (1995).

“Collaborative lesson preparation or classroom observation can externalize SCT tacit knowledge into text at the subject panel level through dialogue.”

(X13)

The study confirms that codifying tacit knowledge through externalization, a purpose of KM, can create a capable structure that retains, creates, and applies

knowledge for problem-solving and the sustainable development of the organization, as suggested by Cheng (2015a).

“Systematically classifying and storing information related to SCT explicit knowledge is crucial for as a reference for novice teachers and future use for problem solving.”

(X4)

The heavy workload poses significant challenges for teachers in revising, accumulating, and sharing SCT explicit knowledge, potentially adversely affecting the externalization of SCT tacit knowledge into explicit knowledge at the subject level in X School. This finding aligns with Pow & Wong’s (2017) argument that the heavy workload and other workplace factors hinder teachers from effectively leveraging SCT knowledge.

“Heavy workload and lack of time may prevent us from modifying teaching materials and making revisions, posing the biggest challenge to our revision, accumulation, and sharing of SCT explicit knowledge.”

(X5)

X1 also acknowledges the importance of creating space for teachers, as the lack of space and time presents significant challenges.

“I agree that creating space for teachers is crucial due to the challenges

posed by the lack of time and space.”

(X1)

X School lacks a system to encourage the review of previous years' collaborative lesson planning meeting minutes, potentially undermining the effectiveness of SCT knowledge sharing and creation.

“A system to encourage novice teachers to review minutes of previous years' collaborative lesson planning meetings has not been established, and it is up to teachers to take the initiative to find them.”

(X12)

Some teachers at X School rarely review these written records because they misunderstand that the records are only for record-keeping purposes and may not necessarily be accessed by the next year's teachers for review.

“Written reflection notes will be submitted to the panel head, which will pass them to the curriculum group. However, they may only serve record-keeping purposes and not be available for the next year's teachers to review.”

(X11)

4.1.1.5.3 The Combination process that facilitate the combination of group-specific

SCT knowledge into school SCT knowledge through Combination in X

School

Yeh et al. (2011) define combination as the process of integrating concepts into a knowledge system. At X School, X1's centralized knowledge leadership has not yet enabled an effective KM system to facilitate the integration of SCT knowledge across subject areas.

“The integration across subject areas relies on central directives for related activities, but cross-disciplinary activities are generally limited in number.”

(X3)

Limited opportunities for cross-department sharing of knowledge may hinder the effectiveness of combining group-specific SCT knowledge into school SCT knowledge through collaboration at X School. The findings of this study align with Cheng's (2019a) viewpoint that the combination process is the most challenging in any school. Furthermore, according to Cheng (2019a), the absence of a shared knowledge vision and systems thinking makes it challenging to integrate explicit subject SCT knowledge for a higher-order collective.

“Cross-department sharing of SCT knowledge is limited, resulting in less cross-subject integration.”

(X10)

In X School, X4 is expected to coordinate inter-disciplinary collaboration to integrate group-specific SCT knowledge into school-wide SCT knowledge. Without effective coordination of interdisciplinary collaboration, it is difficult to facilitate the SCT combination process, which involves systematically integrating SCT knowledge into the school's knowledge system as a knowledge asset, as suggested by Cheng (2019a).

“PSMCD should plays a crucial role in promoting inter-disciplinary integration, but may lack familiarity with English, Math., or General Studies curriculum. This makes it challenging to combine and integrate the four core subjects’ SCT knowledge into school’s knowledge asset.”

(X7)

The knowledge leaders’ role model effect at X School is small, indicating that the principal’s, vice-principals’, and PSMCD’s centralized knowledge leadership in terms of knowledge behavior and decisions has little role model impact on middle managers and teachers, who are also capable of performing knowledge leader roles. This effect occurs because the X1’s SCT policies and leadership practices cannot influence the knowledge behavior of middle managers and teachers.

4.1.1.5.4 Teachers internalize SCT explicit knowledge into tacit knowledge through the Internalization process

Nonaka & Takeuchi (1995) define internalization as the process of embodying explicit knowledge into tacit knowledge. However, novice teachers at X School struggle to internalize Galton's six SCT principles due to a lack of a specific strategy to facilitate internalization. According to Nonaka & Takeuchi (1995), the internalization process should involve the concept of 'learning by doing' through lesson practice, which is absent at X School. This absence makes it challenging for teachers to internalize SCT explicit knowledge into their tacit knowledge.

Furthermore, the findings of this study align with Cheng's (2019a) analysis that codifying tacit knowledge into teaching materials decontextualizes explicit knowledge from the teaching context. This can make it challenging for novice teachers to rely solely on SCT explicit knowledge presented in documents when putting it into practice in the classroom. The detached nature of the SCT explicit knowledge from the actual classroom context may hinder its internalization.

“The absence of a systematic strategy to help novice teachers internalize Galton's six SCT principles may lead to ineffective SCT classroom practices by these teachers.”

(X2)

“Novice teachers cannot rely solely on SCT explicit knowledge presented in documents to put it into practice in the classroom, as it may be

detached from the actual classroom context and difficult to internalize.”

(X9)

In summary, the knowledge leadership practices and organizational factors that support KM and SECI processes in X School for effective SCT implementation include supportive infrastructure, teacher learning opportunities, and partner support. However, the lack of knowledge leaders as role models, non-alignment with the school’s vision and mission, low collegial trust, and the absence of a culture of knowledge sharing and collaboration contribute to ineffective KM knowledge leadership

4.2 The case study of Y School

4.2.1 The Influence of KM on the implementation process of SCT in Y School

4.2.1.1 Y School Teachers’ and Principal’s perception of KM in their Own Unique

School Context

In order to capture and acquire SCT knowledge and enhance teaching and learning quality, the former principal of Y School invited the original prefect of studies from X School to become the PSMCD in the 2015-16 academic year. This appointment facilitated the transfer of SCT knowledge assets to Y School.

In the 2018-19 academic year, the former PSMCD was promoted to the position of the current principal of Y School. Since the academic year 2018-19, Y1 has taken a

significant initiative by implementing KM. Y1's approach is in line with the principles outlined by Nonaka & Takeuchi (1995), Hansen et al. (1999), Zack (1999), and Cheng (2015a, 2019a), ensuring that teaching plans and practices are carried out with maximum efficiency. Y1 put a critical step forward and utilized KM since 2018-19 to create a mechanism that enable all school knowledge leaders and teachers to retrieve and use school's knowledge as a resource to plan and carry out their teaching effectively.

While the former PSMCD was promoted to the position of principal at Y School in the 2018-19 academic year, the school faced the challenge of declining student population and the potential threat of school closure again. To address this, Y1 initiated discussions with the Senior Management Team (SMT) regarding this critical issue. They collectively reached a strategic decision that high-quality teaching and learning through the effective implementation of SCT should be the source of their school's competitive advantage, aiming to significantly enhance parental choice in future Primary One admission.

However, the challenge Y School encountered was that most novice teachers had not received SCT professional development, unlike the senior teachers who had already benefited from such training.

“The former principal participated in an SCT pilot project in 2008-09, and

colleagues who participated knew Galton's six SCT principles. However, as the school expanded, it became challenging to ensure that new colleagues were aware of these SCT principles."

(Y1)

As a result, the SMT identified KM as a potential strategy to enhance the effectiveness of SCT implementation and achieve this goal. The SMT's collective decision to implement KM under Y1's leadership aligns with Cheng's (2015a) argument that KM models support strategic planning, enabling schools to survive in a turbulent policy environment.

"The collective decision of the SMT to utilize KM in addressing the implementation problem of SCT to cope with the challenge of declining student population is a vital strategic decision. In my opinion, the achievement of the school's goals heavily relies on effective planning."

(Y1)

Y1, along with the SMT as centralized knowledge leaders, initiated a knowledge audit to identify the school's knowledge needs. The audit includes identifying the knowledge requirements for effective KM implementation and identifying key individuals who can fulfill those needs, which aligns with López (2013). Besides, the exercise of knowledge audit also fosters a sense of ownership among teams as

suggested by Chan (2022). Y1 is leading the school team to identify school's knowledge need as suggested by López (2013). It serves the same purpose as "mapping knowledge assets" (Nonaka et al., 2000, p.22).

"We decided to conduct a knowledge audit in order to identify the necessary knowledge for the successful implementation of SCT and data mining in our school. This audit provides valuable insights for the SMT to make informed decisions regarding the specific details of implementing KM, including the selection of appropriate strategies, tools, and evaluation methods. The ultimate goal is to bridge the existing knowledge gap and ensure the effective implementation of KM and SCT."

(Y1)

After completing the knowledge audit, the Y1 was astonished to discover that SCT knowledge in the school had become orphan knowledge. This means that while the knowledge was not lost as the case in X School, it had been forgotten, ignored, or neglected in Y School, as suggested by Caddy (2001). This occurred after the recognition of Y School as an outstanding Inventory Case by the OECD's Innovative Learning Environments research project in the 2012-13 academic year, when the school was no longer facing the threat of school closure.

Y1 believed that knowledge and learning are the critical factors for school's

success and competitiveness. Y1 as a former PSMCD, strongly recommend to adhere to Galton's six principles of SCT to improve teaching and learning quality of the school.

“As a former PSMCD, I aimed to closely adhere to Galton's six principles of SCT to improve teaching and learning quality. Our school prioritizes children's learning, which is our knowledge vision and moral purpose.”

(Y1)

At Y School, the teachers worked hard to integrate KM initiatives with their core business of learning and teaching. Y1 made KM a vital focus due to its importance for effective learning and teaching, particularly in an environment of class reduction and potential school closure. Y1 together with SMT started the strategic planning of KM and initiated the discussion of 2018-21 school development plan with the whole school teachers. As a result, all school teachers shared the need of implementing KM initiative and developed the following major concern one for the school development of Y School.

“Major concern one for the school development plan of Y School for the academic years 2018-19 / 2019-20 / 2020-21 (in order of priority):

1. Establishing SCT Learning Circles to promote effective teaching strategies and enhance students' learning effectiveness.

- (i) *Arrange teacher participation in SCT training and engage in lesson studies to collectively develop skills that cater to diverse student learning needs.*
- (ii) *Utilize SCT Learning Circle/ Lesson Co-planning time to develop, revise, and integrate SCT teaching resources, creating instructional materials that align with different learning needs.*
- (iii) *Improve teaching strategies and restructure classroom learning experiences to promote high engagement and interactive learning.*
- (iv) *Continuously empower students with learning skills and strategies to foster self-directed learning.”*

(2018-21 School Development Plan of Y School, p. 10).

In the 2021-22 Annual Report of Y School, building a KM system is highlighted as a major task. According to the report, “under the guidance of department heads, subject teachers reorganized the school-based curriculum and teaching resources to align with curriculum guidelines and student needs, ultimately establishing the KM system” (2021-22 Annual Report of Y School, p. 12).

In the 2018-21 School Development Review, Y School reviewed the effectiveness of the 2018-2021 school development plan and found that the implementation of SCT learning circles was very effective. The objective of utilizing

“SCT Learning Circle/ Lesson Co-planning time to develop, revise, and integrate SCT teaching resources, creating instructional materials that align with different learning needs” was attained. The following is the review on the implementation of SCT Learning Circles.

“Continuing to utilize SCT Learning Circles as a platform, arrange teachers to engage in “lesson study” and collectively explore innovative learning models that suit the needs of children. This aims to promote student learning based on their individual learning styles and progress.”

(2021-24 School Development Plan of Y School, p. 2).

Based on the 2018-21 School Development Review, Y School has made the decision to continue utilizing SCT Learning Circles (please refer to 4.3.1.3.1 and 4.3.1.3.2) as a platform and arranging teachers to engage in “LS” in the 2021-24 school development plan. Enhancing the effective implementation of SCT through the KM initiative remains a core priority for the school. The following represents the major concern for the school development plan during the academic years 2021-24.

“Major concern one for the school development plan for the academic years 2021-22 / 2022-23 / 2023-24 (in order of priority):

- 1. Enhancing the effectiveness of teaching and learning through the promotion of “Paradigm Shift in Learning and Teaching”.*

- (i) *Arrange teacher participation in SCT training to collectively construct effective classroom environments.*
- (ii) *Utilize SCT Learning Circle/Co-planning time to develop effective strategies for “learning”, “teaching”, and “assessment” to drive the paradigm shift in learning and teaching.*
- (iii) *Implement the Galton’s SCT six principles to facilitate efficient classrooms, develop effective strategies for learning and teaching, and promote high student engagement and interactive learning.*
- (iv) *Strengthen the development and optimization of interdisciplinary learning activities to enable students to apply various learning skills and strategies. By integrating knowledge, enhance students’ overall abilities.”*

(2021-24 School Development Plan of Y School, p. 18).

Mohapatra et al. (2016) propose that a school’s KM strategy must align with its major concerns for successful implementation. Both the 2018-21 and 2021-24 school development plans of Y School successfully aligned the school’s major concerns with the KM strategy and implemented it, which aligns with Mohapatra et al. (2016).

“As a novice teacher, I found the school’s knowledge vision aligned well with the school development plans and various annual school development plans.”

(Y12)

Y School employs KM to facilitate strategic planning. This involves conducting a comprehensive assessment of the school environment, as well as evaluating internal strengths and weaknesses. The findings from the school's analysis are then used to prioritize action planning for both KM and SCT, aligning with the recommendations put forth by Cheng (2015a).

Integrating KM activities with teaching and learning is critical for successful implementation of a KM strategy in Y school which aligns with Du Toit & Steyn (2011). The centralized knowledge leaders of Y School, as instructional leaders, saw KM as a key strategy to address SCT problems and enhance student learning. The shared school's knowledge vision is aligning with SCT policy goals to optimize student learning.

“I believe that SCT can improve student learning outcomes, and our school's knowledge vision aligns with and supports this concept.”

(Y11)

Cheng (2015a) proposes a KM model to guide school leaders in improving strategic planning, while Cheng & Chu (2018) emphasize the importance of mapping knowledge domains and aligning KM strategies with school improvement strategies.

Y1 shares the belief that SCT Learning Circle serve as a vital tool for implementing

the KM initiative and promoting sustainable development, which aligns with Cheng's (2015) and Cheng & Chu's (2018) perspectives.

“Our school’s knowledge vision prioritizes promoting student learning. We believe SCT Learning Circle is an important KM initiative that can complement the realization of our knowledge vision to optimize student learning.”

(Y1)

Chu (2014) suggests that once teachers recognize the importance of KM, they will be willing to implement it systematically to make it a successful practice in school. The principal, middle managers, and teachers at Y School viewed SCT Learning Circle as a major KM initiative crucial for sustainable school development. Teachers are willing to implement KM and worked hard to make it a successful practice at Y School.

“As a principal, I see the school’s KM initiative and shared knowledge vision of promoting happy and effective student learning, along with SCT Learning Circle, as two sides of the same coin.”

(Y1)

“SCT Learning Circle, as a KM measure, is crucial to effective implementation of SCT and a key factor in SCT’s success.”

(Y6)

“As our effective KM strategy optimizes SCT and helps our school develop, we are willing to get the job done.”

(Y12)

The approach of SCT Learning Circle aligns with Cheng (2015a, 2019a) and enables the school to effectively manage knowledge resources, support teachers in lesson preparation, and foster continuous teacher learning. Ultimately, the SCT Learning Circle directly contributes to the school’s core focus on the optimization of learning and teaching.

Y School’s vision and mission align with SCT, and applying SCT Learning Circle as a major KM initiative enables teachers to acquire, share, create, transfer, apply, and internalize SCT knowledge, optimizing student learning in the teaching process.

Principal, middle managers, and teachers at Y School fully appreciated the power of shared school knowledge vision which facilitate the smooth implementation of KM and SCT in Y School which aligns with Zack, (1999), Cheng (2013, 2015a, 2019a) and Hu (2019).

“School knowledge vision emphasizes joyful and effective learning, promoting effective learning through enhancing teacher professional development. A

shared vision generates power to promote student learning by aligning system thinking and school's development direction."

(Y2)

Middle managers, including Panel Heads, Vice-panel Heads and Subject Coordinators view SCT policy as crucial for sustainable school development.

"SCT provides opportunities for school development and helps overcome the crisis of school closure at our school."

(Y8)

The documentary analysis data were consistent with the interview results.

"All teachers agree that using Galton's six SCT principles can effectively improve classroom efficiency and enhance teaching and learning effectiveness."

(2020-21 Annual Report of Y School, (p. 10))

"100% of teachers agree that the six principles of small-class teaching can effectively improve classroom efficiency and enhance student learning and teaching effectiveness."

(2022-23 Annual Report of Y School, (p. 11))

Y School recognizes KM as a vital tool for school development, extending

beyond record-keeping.

“Each core subject department head leads the subject teachers to establish school-based curriculum and instructional resources based on the curriculum guidelines and students’ learning needs, continuously optimizing the KM system.”

(2023-24 Annual School Plan of Y School, (p. 26))

The SCT Learning Circle serves as the primary means for socializing, externalizing, combining, and internalizing SCT PCK. The data from interviews and documentary reviews are triangulated and indicate that the KM practices at Y School have effectively generated both tacit and explicit knowledge, leading to the creation of knowledge assets and resulting in improvements in education quality. These findings align with Cheng’s research (Cheng, 2023a).

4.2.1.2 The Influence of Codification KM Strategies on reviewing SCT endeavors last

15 years in Y School

Y School utilizes a codified KM strategy through its FMS system, allowing for SCT review and analysis. The system stores and retrieves SCT documents while facilitating SWOT analysis to identify strengths, weaknesses, opportunities, and threats in the SCT classroom context. FMS also employs data mining methods to analyze retrieved documents and preserve the school’s intellectual assets.

“As English panel head, I use KM to establish a teaching material library beneficial for the entire team.”

(Y7)

“Using KM to develop SCT makes our digital archives more systematic, preventing the loss of SCT knowledge assets.”

(Y11)

The documentary analysis data were consistent with the interview results.

“Each head of the core subjects leads the subject teachers to establish school-based curriculum and teaching resources according to the curriculum guidelines and students’ learning needs, and to establish a knowledge management system. After establishing the KM system, 97% of teachers agree that school-based curriculum and teaching resources can contribute to teaching, and 100% of students agree that school-based curriculum and teaching resources can contribute to learning.”

(2022-23Annual Report of Y School, (p. 14))

Y School has launched SCT project for more than 15 years. Y School has made significant SCT progress through exchange activities and collaborations with experts from HK and mainland China (See Table 4.2).

Table 4.2 Past 15 year's SCT endeavors of Y School since 2008

Year ^(*)	Program ^(*)
2008-2009 ^(*)	Y School was selected by the <u>HKIEd</u> as one of the three pilot schools for SCT in Hong Kong. ^(*)
September 2008 ^(*)	Y School established a "Small Class Teaching Working Group" in September 2008, which clearly defined its scope of work and formulated policies for SCT. ^(*)
September 2008 ^(*)	A professional development workshop on the how to promote SCT was held. ^(*)
October 2009 ^(*)	Y School has been invited by the <u>HKIEd</u> to participate in the "Small Class Teaching Leadership Collaboration Program" as a core member (there are ten schools invited in Hong Kong). ^(*)
2009 ^(*)	Professional exchange activities for small class teaching were held, and school administrators from Nanjing visited Y School. ^(*)
2010 ^(*)	The Greater China Small Class Teaching Forum organized by <u>HKIEd</u> visited Y School and conducted class observations. ^(*)
2011 ^(*)	An English expert from Nanjing Education Bureau visited Y School. ^(*)
October 2011 ^(*)	Members of the five-week small class curriculum Chinese team of the <u>HKIEd</u> visited Y School. ^(*)
February 2012 ^(*)	Members of the five-week small class curriculum Chinese team of the <u>HKIEd</u> visited Y School. ^(*)
March 2012 ^(*)	Members of the five-week small class curriculum General Studies team of the <u>HKIEd</u> visited Y School to share experience in SCT. An English expert from Nanjing Education Bureau also visited Y School. ^(*)
March 2013 ^(*)	Members of the five-week small class curriculum Chinese team of the <u>HKIEd</u> visited Y School. ^(*)
May 2014 ^(*)	An English expert from Nanjing Education Bureau visited Y School. ^(*)
May 2013 ^(*)	An outstanding Inventory Case by the OECD in their Innovative Learning Environments research project in SCT. ^(*)
2018-2019 ^(*)	Y School participated in the School Partnership Program (Small-class Teaching) (P.5 English) to enhance effectiveness of SCT. ^(*)

Using the codification strategy and the KM system, Y School efficiently prepares and retrieves SCT documents for implementation. This includes important documents like the SCT teaching manual, previous SCT Learning Circle records, SDP, ASP, ASR, student background records, and test scores for SWOT analysis. The KM system streamlines document retrieval, saving time and enhancing teachers' productivity during SCT implementation.

4.2.1.3 The Key Personalization Strategies used to implement KM in the Y School

Y School adopted the SCT Learning Circle, recommended by Cheng (2019a) as an effective personalization strategy, for creating and transferring SCT knowledge. This strategy face-to-face dialogue within Learning Circle is used to facilitate knowledge sharing among members and promote a good school culture of mutual

trust and collegial collaboration among teachers.

“SCT Learning Circle is the most important and effective KM measure used by schools. By combining KM with Learning Circle to optimize teaching and learning practices, we can promote excellent school development and foster a KM culture among colleagues. Learning Circle creates a unique culture within the school, characterized by mutual trust, peer sharing, and collegial collaboration among teachers. This positive school culture and working atmosphere are attributed to the excellent development of the Learning Circle, which cultivates a good school culture.”

(Y4)

Nicolas (2004) illustrates that teacher professional growth activities involving interactive people-to-people sharing of knowledge are people-based personalization strategies. Y School also use mentoring system as another major personalization strategy, allowing face-to-face professional dialogue with shared language and classroom practices among teachers for SCT knowledge creation and transfer which is consistent with the finding of Nicolas (2004).

“Our strategy for SCT Learning Circle includes appointing form coordinators or experienced teachers to mentor novice teachers and creating a safe and trusting working environment for professional

dialogue to share SCT tacit knowledge, enabling teachers to improve their SCT practices.”

(Y9)

The creating and transferring school knowledge were two vital pillars of the interactive relationship in the KM process. SCT Learning Circle became Y School’s primary personalization strategy since the 2018-19 school year. The following are research findings from documentary review on the effectiveness of SCT Learning Circle for SCT implementation:

“Since the 2019-20 academic year, the heads of the Chinese, English, and Math. panels lead each Learning Circle to promote curriculum and pedagogical research, strengthen Learning Circle preparation efficiency, develop refined teaching, and improve teaching and learning outcomes.”

(2018-19 School Annual Report of Y School, (p.29))

“Learning Circle enables teachers to participate in professional dialogue, discussing teaching objectives, difficulties, classroom design, textbook utilization, methods, and strategies.”

(2019-20 Annual Report of Y School, (p. 9))

“Through collaborative lesson planning in Learning Circles, teachers can design classroom activities based on students’ difficulties. Meanwhile,

during individual performance evaluations and classroom observations, some teachers' instructional materials are excellent. It is recommended to share them during subject meetings and store them in the respective subject files to enrich school-based teaching resources for future reference in the next year.”

(2022-23 Annual Report of Y School, (p. 14))

The following are findings from interviews that align with the data from documentary review on the effectiveness of SCT Learning Circle for SCT implementation:

“SCT Learning Circle enhances teachers' professional development and promote student learning.”

(Y2)

“Most teachers have mastered Galton's six principles, which are related to SCT Learning Circle implementation.”

(Y3)

Y School successfully integrates KM with improving student learning by utilizing SCT Learning Circle to develop effective strategies to align teaching, learning, and assessment, and promote paradigm shift in teaching since the 2018-19 school year.

“Since the 2018-19 school year, we combine KM with improving teaching through SCT Learning Circle implementation, promoting a collaborative work culture in schools.”

(Y4)

The interview data analysis showed that Y School’s personalization strategy was more effective than X School’s one in creating opportunities for SCT knowledge creation and transfer. The SCT Learning Circle, as a personalization strategy, is essential for investing resources in creating processes, tools, and networks that promote and enhance personal interactions among teachers for SCT knowledge creation and transfer. This is particularly crucial in crafting the SCT pedagogical strategy, which aligns with the findings of Benbya & Belbaly (2005).

“I insisted on basing teacher appraisal on Galton’s six principles (refer to Appendix two: Lesson Observation and Teacher Appraisal Form). Having a common language to communicate with makes handling lesson planning, implementation and evaluations in the SCT Learning Circle easier.”

(Y1)

Y1 promotes alignment of learning, teaching, and assessment through SCT Learning Circle, constructing high-quality classroom teaching using Galton’s six SCT principles in the SCT classroom context.

4.2.1.4 *The mastery of Galton's SCT six principles in Y School's classroom*

4.2.1.4.1 *In terms of the better balance between teacher talk and pupil talk*

Systematic classroom observation analysis showed that the average % observation with no pupil in focus in Y School was 38%. In a 40-minute period, there was a maximum of 24.8 minutes to give individual attention to 25 pupils, giving each pupil 59.52 seconds. All observed teachers were novice teachers in Y School.

Cluster analysis identified four teacher types of classroom behaviors in Y School:

- Type 1 (40%): individual/ pair sustained enquirers
- Type 2 (22%): group task monitors
- Type 3 (26%): Whole class instructors
- Type 4 (12%): Whole class questioners

Novice teachers (Y10, Y11, Y12, and Y13) at Y School achieved more individual attention for students and a better balance between teacher and student communication compared to the senior and novice teachers at X School. This indicates better socialization and internalization of SCT tacit knowledge through the use of SCT learning circle, which serves as a contributing factor. (See Appendix four).

The interview with Y13 at Y School was consistent with the above lesson observation data analysis.

“We emphasize the importance of questioning techniques and encourage

teachers to allow students to express themselves more while explaining the reasons behind their answers, all of which we value greatly.”

(Y13)

4.2.1.4.2 In terms of the result of the Interviews and Documentary Analysis

Based on interviews and documentary analysis, Galton’s SCT six principles were applied in Y School’s classrooms as follows:

Most Y School teachers can master Galton’s six SCT principles in their classroom practices.

“I participate in classroom observations for teacher appraisal and collegial lesson observations in the Learning Circle, where Galton’s six SCT principles are frequently applied by everyone.”

(Y2)

“SCT Learning Circle is effective, particularly for novice teachers to master Galton’s six SCT principles and apply them in daily classroom practices.”

(Y10)

The data analysis from the documentary review is consistent with interviews results.

“The questionnaire shows that 100% of teachers agree that they can

improve their mastery and use of SCT classroom skills through SCT Learning Circle.”

(2018-19 School Annual Report of Y School, (p.29))

4.2.1.4.2.1 In terms of the Clear Statement Learning Objectives

The first principle guiding SCT practice improvement is a clear statement of learning objectives for the lesson. Most interviewed teachers agreed they could specify learning objectives, consistent with the documentary review data.

“We have a simple teaching objective sign in each classroom, and teachers write learning objectives on the blackboard to remind both students and themselves of the lesson’s main focus.”

(Y2)

The data analysis from the documentary review is consistent with interviews results.

“After observing teachers for a year, it’s clear that they can effectively communicate learning objectives and encourage student reflection and ownership over their learning. Additionally, they can design lesson plans that align with objectives and help students assess their understanding of the material.”

(2015-16 School Annual Report of Y School, (p.23))

4.2.1.4.2.2 In terms of the Extended Questioning during the Whole Class Discussion

Extended questioning during whole-class discussions is the second principle for improving SCT practice. Most teachers interviewed were proficient in questioning techniques, but there was still room for improvement. To address this, Y School's principal and SMT decided to implement Learning Circle in the 2018-19 school year.

“Not all teachers have strong questioning skills, but SCT Learning Circle provides a platform for discussing and improving questioning skills in lesson planning.”

(Y2)

Here's an example of Y13, who is a novice teacher, using questioning techniques to promote student learning and extend whole-class discussions.

“As a General Studies teacher, I value students' thoughts on life but use different questioning techniques to clarify misunderstandings when they encounter difficulties. For example, while teaching about the moon to P5, I guided them to discover correct answers themselves through questioning techniques, instead of providing direct answers.”

(Y13)

This example highlights how Y13 used questioning techniques to clarify student misunderstandings about the moon and guide them towards correct answers, facilitating their learning process.

Y School's principal, middle managers, and teachers collaborated to optimize the use of extended questioning during whole-class discussions to improve SCT practice. The successful implementation of Learning Circle in the 2018-19 school year yielded positive results, and progress has been steady. The data analysis from the documentary review is consistent with interviews results.

“Classroom observations revealed that teachers used various questioning techniques and adapted their questions to the abilities of students with different levels of understanding.”

(2021-22 Annual Report of Y School, (p. 10))

4.2.1.4.2.3 In terms of the More Active Pupil Participation

Boosting active student participation is the third principle for improving SCT practice. While Y School teachers organized classroom activities aligned with learning objectives, there is still room for improvement in promoting active student participation during the 2015-16 school year.

“Low student motivation and passive learning behaviors may contribute to the need for improvement in promoting active student participation.”

(2015-16 School Annual Report of Y School, (p.23))

Y School's principal, middle managers, and teachers were committed to improving active student participation to enhance SCT practices. The successful

implementation of Learning Circle in the 2018-19 school year yielded positive results and steady progress in improving active student participation, as follows:

“Active student participation is highly valued in class, and direct teaching methods are rarely used except for procedural knowledge.”

(Y4)

The data analysis from the documentary review is consistent with the interview results.

“Effective student participation in class is promoted through the construction of classroom teaching with activities closely linked to objectives and the use of questioning, feedback, and summarization techniques.”

(2018-19 School Annual Report of Y School, (p.10))

Y School recommends using ICT platforms to strengthen communication with students before, during, and after class, increasing interaction among students and between students and teachers, and enhancing student participation.

“Teachers can assign diverse pre-class and extension activities tailored to each subject’s characteristics and needs, incorporating electronic technology to enhance student interest and motivation in learning, as reported by 100% of teachers.”

(2021-22Annual Report of Y School, (p. 10))

4.2.1.4.2.4 *In terms of the More Cooperation between Pupils through Pair Work and Group Work*

The fourth principle for improving SCT practice is to promote cooperation among students through pair and group work, with teachers helping students establish their own rules for working together and evaluating their effectiveness at the end of the task. Y School teachers organized pair and group work, believing that cooperative learning strategies can enhance teaching and learning effectiveness.

Novice teachers at Y School may face challenges in organizing cooperative learning activities without enough professional training. To address this, Y School held cooperative learning training for new and experienced teachers in the 2016-17 school year.

“Cooperative learning is an effective teaching strategy that Y School has been using since 2008. To help novice and experienced teachers master the skills through practice, training on cooperative learning was provided during the 2016-17 academic year due to an influx of novice teachers.”

(2016-17 School Annual Report of Y School, (p.22))

The successful implementation of SCT Learning Circle and effective teacher learning in cooperative learning have yielded positive results and steady progress in developing cooperation among students through pair and group work, as follows:

“Cooperative learning group activities are fundamental in our classroom, with settings arranged in small groups and students trained in pairs before transitioning to groups of four.”

(Y2)

The data analysis from the documentary review is consistent with the interview results.

“The questionnaire revealed that 100% of teachers agree that cooperative classroom activities promote active student participation and interactive learning, enhancing student interest in learning.”

(2018-19 School Annual Report of Y School, (p.10))

4.2.1.4.2.5 In terms of the Less Summative Feedback and More Formative Feedback

The fifth principle for improving SCT practices is to provide feedback that helps students review their work, identify mistakes, and develop problem-solving skills to become self-regulated learners. Y School teachers recognized the need to improve feedback, as some lacked specificity or did not explain students’ strengths and weaknesses. SCT Learning Circle was implemented to optimize feedback and help students review their work.

“Improvements can still be made in providing appropriate feedback.”

(2015-16 School Annual Report of Y School, (p.23))

Y School’s principal, middle managers, and teachers were committed to

improving appropriate feedback to facilitate the improvement of SCT practices. Their efforts have yielded positive results and steady progress, as follows:

“Regarding teachers’ feedback, colleagues give useful feedback to help students understand and correct mistakes independently.”

(Y2)

The data analysis from the documentary review is consistent with interviews results.

“Teachers review students’ learning outcomes, understand their progress and difficulties, and provide feedback to improve learning effectiveness and teaching.”

(2020 Focus Inspection Report of Y School, (p.4))

“Classroom observations revealed that teachers provided positive feedback to boost students’ confidence.”

(2021-22Annual Report of Y School, (p. 11))

4.2.1.4.2.6 In terms of the More Assessment for Learning

The sixth principle for improving SCT practices is to encourage formative assessments with AfL and not just rely on summative assessments. Y School teachers recognized the need to improve AfL and organized a workshop for teachers through the AfL task force.

“AfL experts from the United States were invited to conduct an external

evaluation of Y School's AfL practices, focusing on optimizing their work and addressing any deficiencies."

(2015-16 School Annual Report of Y School, (p.23))

Y School's principal, middle managers, and teachers were committed to improve the use of AfL to enhance SCT practices. Their efforts have yielded positive results and steady progress, as follows:

"After teachers provide feedback, self-assessment and peer-assessment are also considered. When classrooms are arranged in this manner, the effectiveness of SCT is further improved."

(Y9)

The data analysis from the documentary review is consistent with interviews results.

"Chinese, English, and Math. use formative assessment to help students self-assess their learning progress, promoting self-directed learning."

(2020 Focus Inspection Report of Y School, (p.2))

"Records show that Chinese, English, and Math. use SCT Learning Circle for curriculum and pedagogical research, teaching plan design with the "assessment literacy" strategy, and focused classroom observations and analysis. (See Appendix ten: Primary 6 Unit Lesson Plan for Learning

Circle Collegial Lesson Observation (in Chinese) of Y School to see feedback and reflection in the Learning Circle lesson plan.”

(2020-21Annual Report of Y School, (p. 9))

4.2.1.4.3 *In terms of the result of the Lesson Observations and Documentary Review*

In term of the four novice teachers’ classroom observations (Y10, Y11, Y12 and Y13), Y School can successfully apply Galton’s SCT six principles as follows:

4.2.1.4.3.1 *In terms of the Clear Statement Learning Objectives*

All Y School’s novice teachers (Y10, Y11, Y12 and Y13) effectively specified and communicated clear learning goals and objectives while giving more attention to process objectives for peer-feedback and self-evaluation. They catered to student needs and abilities, linked learning objectives to appropriate teaching methods, and used student-centered strategies for higher level objectives. The following documentary analysis results are consistent with the lesson observation results.

“The teacher teaches diligently, is kind and friendly, often encourages students, and has clear teaching onjectives.”

(2018 External Review Report ((QAD,EDB) of Y School, (p. 6))

“During classroom observations, teachers presented teaching objectives and guided students in learning based on these objectives.”

(2020-21Annual Report of Y School, (p. 12))

4.2.1.4.3.2 In terms of the Extended Questioning during the Whole Class Discussion

The second principle for improving SCT practice is extended questioning during whole-class discussions. Novice teachers (Y10, Y11, Y12 and Y13) at Y School effectively extended questioning during these discussions, allowing sufficient thinking or waiting time between questions and responses.

Teachers at Y School tended to use encouraging phrases such as “Interesting. Can you elaborate a little more? (Y11)” “Does any pupil want to add a word?(Y10)” “Does any pupil have a different idea (Y12)?” rather than just repeating the first answer received. Children’s minds were not empty vessels, they may have a partial understanding of even complex ideas. For example, Y13’s lesson about the Earth and Moon began by exploring “What is your previous knowledge on the matter?” “Why is the moon sometimes dark?” “Why is the moon sometimes bright?” “Can you explain?” before teaching the unit. Novice teachers(Y10, Y11, Y12 and Y13) at Y School explored pupils’ ideas more before beginning instruction.

At Y School, teachers (Y10, Y12 and Y13) used positive responses and extended questioning to stimulate pupil thinking and encourage inquiry, promoting high-level objectives and thoughtful discourse. Novice teachers Y12 and Y13 adopted questioning strategies that guided and prompted cumulative learning talk. They trained P5 students to explain, argue, give reasons, and arrive at conclusions.

Teachers' expectations of pupils were appropriate and enhanced students' potential; the documentary analysis results are consistent with the lesson observation results.

“The teacher often affirms students' good performance and is able to guide them in improving their answers or reflecting on what they have learned through different levels of questioning, probing, or follow-up questions.”

(2018 External Review Report ((QAD,EDB) of Y School, (p. 7))

“Continuously improve teachers' skills in follow-up questioning, rephrasing, counter-questioning, and using different levels and open-ended questions through training and sharing sessions.”

(2019-20 Annual Report of Y School, (p. 9))

4.2.1.4.3.3 In terms of the More Active Pupil Participation

The third principle for improving SCT practice is to boost active pupil participation. At Y School, novice teachers (Y10, Y11, Y12 and Y13) organized activities that aligned well with learning objectives and provided ample opportunities for students to participate. Clear instructions and positive expectations for pupil learning helped to boost active participation.

The Y School novice teacher used encouraging phrases to invite pupils to join whole-class discussions. Y13 related learning tasks to pupils' daily lives and established a classroom routine conducive to learning. Learning tasks organized by

novice teachers (Y10, Y11, Y12 and Y13) engaged active student participation. Y10 asked a question that all pupils answered willingly with smiling faces, reflecting a positive teacher-student relationship and good interaction in the classroom.

All novice teachers at Y School (Y10, Y11, Y12, and Y13) conducted initial exploration of pupils' ideas before learning activities and held positive expectations for understanding through active participation. The classroom interaction and atmosphere were good, with nearly all pupils eager to answer questions. The following documentary analysis results are consistent with the lesson observation results.

“The teacher attempts to use different teaching strategies to promote student engagement in classroom learning, such as utilizing multimedia information to spark student interest.”

(2018 External Review Report ((QAD,EDB) of Y School, (p. 7))

“According to the questionnaire, all teachers agree that active participation and interactive learning in classroom activities enhance student interest in learning.”

(2018-19 School Annual Report of Y School, (p.10))

4.2.1.4.3.4 In terms of the More Cooperation between Pupils through Pair Work and

Group Work

The fourth principle for improving SCT practice is to develop pupil cooperation through pair and group work. All Y School's novice teachers (Y10, Y11, Y12 and Y13) successfully increased cooperation through cooperative learning with clear instructions and academic challenge. Learning activities allowed for ample active participation by most pupils.

Y12 reminded pupils of cooperation rules in pair work and effectively trained students to switch from pairs to groups of four within five seconds. Clear role assignments in groups (Y10, Y11, Y12 and Y13) fostered positive interdependence and cooperative learning.

All novice teachers (Y10, Y11, Y12 and Y13) at Y School successfully increased cooperation among pupils and provided individual support to cater to diverse learners during group activities. The following documentary analysis results are consistent with the lesson observation results.

“Small group activities in class provide opportunities for students to report their accomplishments and showcase what they have learned after completing tasks.”

(2018 External Review Report ((QAD,EDB) of Y School, (p. 7))

“Observation records from various subjects show that discussion techniques for speaking and communication in pairs, groups of four, and larger groups

cater to students with diverse abilities and learning styles.”

(2020-21Annual Report of Y School, (p. 11))

4.2.1.4.3.5 *In terms of the Less Summative Feedback and More Formative Feedback*

The fifth principle for improving SCT practice is to provide feedback that helps students review their work, identify and correct mistakes, and develop problem-solving skills. All Y School’s novice teachers (Y10, Y11, Y12 and Y13) provided opportunities for pupils to present learned knowledge. The following documentary analysis results is consistent with the lesson observation results.

“The questionnaire showed that 98% of teachers agree that showcasing students’ learning outcomes in class or utilizing the classroom environment enhances students’ confidence and performance in learning.”

(2020-21Annual Report of Y School, (p. 11))

Lesson observations showed most novice teachers (Y11, Y12 and Y13) provided both corrective and informative feedback, offering timely and concrete suggestions to improve learning. All Y School’s novice teachers (Y10, Y11, Y12 and Y13) also provided ample opportunities for students to present their learned knowledge. Y11 used an iPad and Apple TV to provide formative feedback to the group, encouraging improvement and consolidation of learning. Y11, Y12 and Y13 provided timely and concrete feedback to help pupils identify mistakes and improve academic work.

Y School's novice teachers (Y10, Y11, Y12 and Y13) praised pupils for both effort and success, creating a positive classroom atmosphere conducive to learning. The following documentary analysis result is consistent with the lesson observation results.

“Classroom observations showed teachers providing positive feedback to strengthen students’ confidence.”

(2020-21 Annual Report of Y School, (p. 11))

4.2.1.4.3.6 In terms of the More Assessment for Learning

The sixth principle for improving SCT practice is to encourage formative assessments with AfL alongside summative assessments. Most novice teachers at Y School (Y10, Y12 and Y13) assessed learning through both types of assessments and encouraged pupils to summarize lesson content, aligning with learning objectives. Three out of the four observed lessons indicated that teachers encouraged pupils to summarize what they had learned in the lesson, which aligned with the clearly conveyed learning objectives.

All novice teachers at Y School (Y10, Y11, Y12 and Y13) provided positive feedback to improve learning, using more informative than corrective feedback. They engaged pupils in the evaluation process, including peer-feedback and self-reflection, to aid self-regulated learning. For example, Y12 asked pupils to explain how they

arrived at their answer for origami worksheets alongside with peer-feedback and self-reflection.

The following documentary analysis result is consistent with the lesson observation results.

“Learning objectives are reviewed based on SCT Learning Circle /preparation records to align with subject goals and develop students’ self-regulated learning ability.”

(2020-21 Annual Report of Y School, (p. 9))

Overall, most teachers at Y School were regarded by management as being able to implement the SCT six principles, conduct efficient classroom sessions, promote effective teaching and learning strategies, foster high student participation, and facilitate interactive learning.

“80% of teachers are able to implement the SCT six principles effectively in observed classrooms, utilizing effective strategies for teaching and learning, promoting high student participation, and facilitating interactive learning.”

(2022-23 Annual Report of Y School, (p. 11))

In answering the research question about *“To what extent does the use of KM under the guidance of knowledge leadership enable the better implementation of SCT*

policy at the school level?”, Y School’s effective three-tiered knowledge leadership

largely enabled better KM practices to facilitate effective SCT implementation, with

success in all SECI model stages.

Table 4.3 Data to exemplifies each stage of SECI process for examples of PCK

SECI process	Example of PCK	Data used	Page
Socialization	1. Y6: Role model effect and mentoring system. Y1 initiated open classroom practice for novice teachers to observe SCT lesson practices while she was still a PSMCD. Y4 took up this practice while she was promoted to be a PSMCD and shared SCT tacit knowledge with Y5 when Y5 was still a novice teacher. After Y5 got promoted to be the Chinese Panel Head, Y5 shared SCT tacit knowledge with Y6 as a novice teacher. 2. Y10: Role model effect and mentoring system. After Y6 was promoted to be the Panel Head when Y5 was promoted to be a PSMCD, Y6 shared SCT tacit knowledge with Y10 as a novice teacher.	Y8 interview	p.288
		Y4 interview	p.212
		Y6 interview	p.213
		Y6 interview	p.211
		Y10 interview	p.211
Externalization	1.The Math lesson of origami pattern for a cube 2.Use high-quality resources developed in the Learning Circle to participate in external programs and share their SCT experiences	Y12 interview	p.336
		Lesson Observation of Y12	Appendix four p.462
		Documentary Review	Appendix six p.474
		Y8 interview	p.250

Combination	Y School teachers developed reading skills across the curriculum	Y4 interview Documentary Review: School case report on Reading Across the Curriculum Appendix nine: Y School's case report on Reading across the Curriculumr	p. 346 p. 486
Internalization	Y10, Y5, Y4, Y3 & Y2 claimed that teachers can internalize SCT knowledge Y10, Y11, Y12 & Y13 can practice SCT in their own classrooms and have better balance between teacher talk and pupil talk, as well as increase in individualized attention for students Teachers can incorporate SCT's six principles into the lesson plan and reflect on them during the post-lesson review. Most teachers can implement six principles of SCT	Y10 Interview Y5 Interview Y4 Interview Y3 Interview Y2 Interview Systematic classroom observation analysis & Lesson observation record of Y School Lesson Plans Appendix ten: Primary 6 unit lesson plans of Reading across the Curriculum Documentary Review	p.302 p.248 p.345 p.189 p.192 Appendix four p. 462 p. 495 p.208

4.2.1.5 The application of SECI spiral process of SCT creation and transfer in Y

School

4.2.1.5.1 The Socialization process that enable the individual teachers to share their

SCT tacit knowledge through Socialization in Y School

Socialization, where novice teachers learn from experienced teachers, is crucial

for comprehending and internalizing SCT tacit knowledge before implementing it in their own classrooms. Capturing and making this tacit knowledge widely available is a challenge for sustainable improvement, according to Kidwell et al. (2000). Y School's teachers acknowledge the value of socialization in addressing these challenges and achieving effective SCT implementation for better and sustainable school development.

“Novice teachers rely on senior teachers to share valuable SCT tacit knowledge, effectively assisting in learning and mastering SCT principles through socialization.”

(Y10)

Y1 stated that their induction and mentoring system serves as the primary vehicle for facilitating socialization. This system allows experienced teachers within the school to share SCT tacit knowledge with novice teachers, aligning with the findings of Tan (2015).

“As a novice teacher, I learned SCT tacit knowledge through observing and discussing with my teaching mentor, the present PSMCD (Y5). This effective socialization process helped me master tacit knowledge, which is difficult to express in words. Y School's mentoring program aims to pass on such knowledge from one person to another.”

(Y6)

Y School's induction and mentoring scheme fosters a collegial working culture of mutual trust and security, promoting sharing of SCT tacit knowledge through socialization among individual teachers.

“The novice teacher induction and mentoring program established a culture of mutual trust and security, promoting professional discussions and accountability to teaching. This socialization process is vital for sharing SCT tacit knowledge.”

(Y6)

SCT teaching knowledge is basically tacit and embodied in senior teachers' mind, it needs to use personalization strategy for leveraging and sharing the SCT tacit knowledge. Observing teaching mentors in SCT classrooms is essential for novice teachers to understand, master, and internalize SCT principles. Socialization, beginning with observation and imitation, is crucial for sharing SCT tacit knowledge among individual teachers.

“Novice teachers require our SCT tacit knowledge, which we share through open classroom observation. My classes are open for observation by novice teachers at any time without prior reservation.”

(Y4)

Interview data showed that informal chats effectively promoted sharing of SCT tacit knowledge among teachers through common experience and informal sharing.

“Y6, my panel-head, serves as my mentor and we share teaching experiences almost daily. Through these exchanges, Y6 shares SCT tacit knowledge, which I believe helps integrate it through socialization.”

(Y10)

Panel-heads and senior teachers serve as middle managers’ knowledge leaders and role models, fostering a conducive and high-collegial trust environment for knowledge sharing. They encourage novice teachers to use open classrooms for professional dialogue and SCT learning. The initiative is supported by centralized knowledge leaders such as Y1, Y4 and Y5 as a knowledge role model, who open classrooms for idea exchange and SCT tacit knowledge sharing to enhance teaching skills.

“As a novice teacher, my teaching mentor (current PSMCD) opened her classroom for observation, allowing me to apply SCT principles to my own classes. When I became a mentor, I opened my classrooms for novice teachers, passing on SCT tacit knowledge in a “torch passing” process. My mentor was a great role model.”

(Y6)

Novice teachers credit the effectiveness of socialization to SCT Learning Circle

implementation, allowing sharing and internalizing of SCT tacit knowledge among individual teachers.

“My panel-head, who serves as my teaching mentor, shares SCT tacit knowledge of English teaching through our SCT Learning Circle. Observing her SCT classroom practices helped me gradually master and internalizes this knowledge.”

(Y11)

Subject-panel heads and vice-panel heads play a vital role as middle managers’ knowledge leaders in socializing SCT tacit knowledge to novice teachers. Effective SCT Learning Circle depends on their ability to share this knowledge. Centralized knowledge leaders such as principal, vice-principals, and PSMCD empower Subject-panel heads and vice-panel heads as middle managers’ knowledge leaders to enhance SCT implementation knowledge sharing and transfer to teachers and alleviate burnout feelings, as proposed by Cheng’s et al. (2017) study findings confirm this.

“Senior teachers assist novice teachers in SCT Learning Circle. Subject-panel heads lead novice teachers and employ strategies such as opening their classes for classroom observation and subsequent discussion help observe and solve problems faced by novice teachers. As PSMCD, I participated in all SCT Learning Circles in 2018-19, improving

communication with the department-heads and helping solve difficulties faced by novice colleagues in teaching. By the end of the academic year, the department-heads were confident in solving these problems.”

(Y5)

“Panel-heads play a crucial role in SCT lesson design discussions during SCT Learning Circle.”

(Y12)

Y1 and Y4, both of whom were former PSMCDs, collaborated with the current PSMCD (Y5) to design an SCT lesson observation and appraisal form that incorporates Galton’s six SCT principles. This form helps teachers understand, master, and internalize these principles. The role model effect of these centralized knowledge leaders makes the form more convincing and effective. Study findings confirm that knowledge leadership make positive impacts if principals, middle managers, and teachers facilitate knowledge creation and transfer by acting as a role model, as suggested by Masa’deh et al. (2016).

“By utilizing the SCT lesson evaluation and teacher appraisal form and conducting frequent observations, I learned and internalized SCT. I applied the knowledge gained from experienced teachers, the panel-head, and SCT manual, making it my own. The “SCT lesson evaluation and teacher

appraisal form” was helpful.”

(Y12)

At Y School, Y1, Y2, Y3, Y4 and Y5 intentionally paired experienced SCT teachers with novice teachers of the same subject and grade level. This was done to encourage the sharing and transfer of SCT knowledge and experience from the senior teachers to the novice ones.

“The school’s administration encourages the deliberate selection of experienced teachers as grade-level subject coordinators to guide novice teachers. This helps to effectively socialize SCT tacit knowledge.”

(Y9)

4.2.1.5.2 The Externalization process that facilitate subject teachers to externalize their SCT tacit knowledge into subject level explicit knowledge through Externalization in Y School

Cheng (2019c) defines externalization as the conversion of tacit knowledge to explicit knowledge at team, group, and departmental levels. It involves articulating tacit knowledge through dialogue and text records to codify it in a development plan.

At Y School, teachers acknowledge the significance of externalizing the tacit knowledge acquired through SCT Learning Circle. This process aims to update the department’s knowledge and cultivate the school’s IC, aligning with Cheng’s (2013a) argument that knowledge externalization involves converting tacit knowledge into

explicit concepts through collaborative efforts within a subject department.

“Externalization is crucial in the process of knowledge creation through professional sharing, discussion, and integration. By doing so, original knowledge and intellectual assets of SCT can be preserved and passed on to novice teachers systematically. Regular updates to the department’s knowledge are also possible through this process.”

(Y11)

At Y School, the Learning Circle is a useful strategy for subject teachers to convert their SCT tacit knowledge into explicit knowledge at the subject level through externalization. Through collaborative and supportive sharing of personal experiences, insights, and perspectives, teachers can articulate their SCT tacit knowledge, document it, and share it with others. The Learning Circle also helps teachers identify gaps in their own SCT knowledge and understanding of the subject matter. Through discussion and reflection, teachers can deepen their understanding of the subject and develop more effective teaching strategies which aligns with the findings of Avalos (2011) and Brevik (2014).

“During the SCT Learning Circle, we discuss teaching content related to student learning difficulties, brainstorm together, record the results, and review and evaluate the implementation and teaching outcomes. The

reflections are then recorded in written texts or documents.”

(Y4)

Consequently, the process of knowledge externalization enhances the clarity and focus of teaching ideas that may have initially been ambiguous in individual teachers' minds. This clarity arises from the objective understanding facilitated by codified SCT teaching materials and lesson plans. Moreover, this process frequently stimulates the generation of new ideas for implementing SCT.

The grade level collaborative lesson preparation record and departmental professional sharing sessions are also important methods to convert SCT tacit knowledge into explicit knowledge through externalization at the subject level.

“Externalization through recording has two levels: grade-level collaborative lesson preparation records and departmental professional sharing sessions. In the first level, teachers document tacit knowledge and discuss SCT methods. The second level involves teachers discussing teaching difficulties and finding solutions with the subject-panel head. The resulting tacit knowledge is recorded in departmental documents”

(Y13)

The digital archives of SCT teaching materials are crucial in externalizing SCT knowledge, allowing subject teachers to convert their tacit knowledge into explicit

knowledge at the subject and school level. The archive facilitates the systematic KM of SCT knowledge, including sharing, storing, retrieving, and transferring it among teachers and subject panels for long-term enhanced teaching performance and school development. The study's findings indicate that an online environment serves as an additional tool for teachers to share and externalize their tacit SCT knowledge, aligning with the research findings of Yi (2006).

“Externalization is essential for the Math. panel’s development. During summer vacation, all SCT teaching materials created throughout the year are organized and compiled into a final version for the digital archives.”

(Y12)

At Y School, the Learning Circle was crucial in externalizing SCT tacit knowledge into explicit knowledge at the subject level through externalization.

“Professional dialogue and sharing in the SCT Learning Circle facilitate socialization and the externalization of tacit knowledge into explicit knowledge within the subject group through lesson observation or review. This generates easily shareable text for sharing among colleagues.”

(Y6)

4.2.1.5.3 The Combination process that facilitate the combination of group-specific SCT knowledge into school SCT knowledge through Combination in Y

School

Nonaka & Toyama (2005) propose that the combination process further systematizes SCT knowledge into an SCT teaching manual, where explicit knowledge is selected, combined, and refined to create a comprehensive set of SCT explicit knowledge.

Cross-subject sharing encourage and facilitate teachers who participated the Learning Circle to combine subject-specific SCT knowledge from different panels into Y School's overall SCT knowledge. Y4 presented an example of this.

“Novice teachers at Y School combine SCT knowledge from different subjects, facilitated by the implementation of SCT Learning Circle. Two teachers, Y12 and Y13, participated in a Math. pre-learning task project and applied it to their own subjects. Y12 implemented a mixed teaching model in Math., while Y13 applied it to General Studies with good results. Both teachers shared their experiences at a cross-subject sharing event, and Y13 was encouraged to combine the knowledge and expand the approach to other subject areas.”

(Y4)

The school's knowledge vision encourages teachers to integrate and transfer subject-specific SCT knowledge to other subjects under the guidance of system

thinking, despite the extra workload, to integrate it into the school's SCT knowledge.

Y School actively promotes cross-curricular collaboration as it is an effective strategy to achieve their knowledge vision which aligns with the suggestion of Cheng (2019a).

“Our principal, vice-principals, together with PSMCD always emphasize system thinking and actively promotes cross-curricular collaboration as an effective strategy to achieve our knowledge vision.”

(Y6)

“Cross-curricular collaboration can increase student engagement and interest in learning, in my opinion.”

(Y10)

The SMT under the initiative taken by PSMCD plays a crucial role in promoting the combination of group-specific SCT knowledge into school SCT knowledge (Reading Across Curriculum) by encouraging subject panels and teachers to integrate and transfer reading knowledge to other subjects under the powerful influence of “system thinking” and the direction provide by the shared knowledge vision as suggested by Cheng (2019a). Additionally, the PSMCD's coordination and management role as resource allocation is vital in Y School.

“The principal decided on the Reading Across Curriculum program after discussion, and the PSMCD played a crucial role in its promotion. Her

coordination, resource allocation, and management were important for its success. The program improved student learning effectiveness and resulted in teacher satisfaction and colleague appreciation for the cross-disciplinary collaboration”

(Y3)

Three-tiered knowledge leadership emphasizes the role of situational knowledge leadership of middle managers, such as Prefect of Studies, Subject Panel Heads, Vice-panel Heads, and Form Coordinators, in addition to the centralized knowledge leaders and distributed teacher knowledge leaders, for the effective implementation of SCT and the smooth operation of the SECI process in Y School.

“Our school’s policies promote the use of integrated knowledge and generic skills by students, with top-down initiative from the principal’s knowledge leadership and bottom-up initiative from distributed teacher knowledge leadership. PSMCD and Prefect of Studies play a mediating role, respecting the situational leadership role of the Subject-panels, Vice-panel Heads, and Form Coordinators, and their professional judgments. Cross-disciplinary collaboration relies on voluntary teacher participation and has successfully promoted SCT knowledge combination across subjects. This is a cultural characteristic of our school’s curriculum and

pedagogical development.”

(Y4)

The situational knowledge leadership role of middle manager at Y School can facilitate the integration of subject-specific knowledge into the school’s SCT knowledge. SCT knowledge combination involves voluntary cooperation between teachers, Subject-panels, and Prefect of Studies. The study found that the cooperation between the centralized knowledge leaders and middle managers’ situational knowledge leaders established a conducive working environment to develop a shared context or systemizing *Ba* that immersed teachers in the school’s practices with trust, empathy, and shared norms as suggested by (Nonaka et al., 2000a).

Y1 with SMT together provide a centralized knowledge leadership that provide a direction of school development that positively facilitates SCT knowledge combination across subject levels.

“The principal, vice-principals, and PSMCD set SCT development directions for Y School, which are then implemented by middle managers with various Subject-panel Heads. Frontline teachers make professional judgments based on Galton’s SCT six principles. The school creates a shared knowledge vision for SCT development, allowing Subject-panel Heads and teachers enough room to make judgments while emphasizing

centralized SCT development directions.”

(Y1)

The “management level effect” at Y School refers to the impact of the decisions and knowledge behavior of the Principal, Vice-principals, and PSMCD, who serve as centralized knowledge leaders with the power of “system thinking” and the direction provided by shared knowledge vision, on the decisions and knowledge behavior of lower-level employees such as middle managers, Subject-panel Heads, Vice-panel Heads, Subject Coordinators, and teachers as knowledge leaders. Y1’s knowledge actions and decisions influence SCT policies and other knowledge leaders’ leadership practices, which, in turn, promote SCT knowledge sharing among middle managers such as Subject-panel Heads and teachers.

The knowledge leadership management level effect emphasizes the importance of clear, respectful, and ethical communication across all school management levels, and setting a positive role model for middle managers, subject-panel heads, and teachers to follow.

4.2.1.5.4 Teachers internalize SCT explicit knowledge into tacit knowledge through

Internalization.

Galton’s six SCT principles create explicit knowledge, which is then converted into tacit knowledge through internalization by school-teachers. Nonaka & Takeuchi

(1995) argue that this new tacit knowledge sets off a new spiral of knowledge creation. Contextualized SCT knowledge cannot be easily understood through reading SCT documents alone. Novice teachers need to observe and learn in the real SCT classroom context through collegial classroom observation.

“Observing Y5’s real teaching situations can be more effective than studying lesson plans alone. A profound lesson was observed where the teacher’s use of body language and tone of voice helped younger students focus, be happy, and learn more effectively. Then, I try to practice what I have learned in my own lesson.”

(Y6)

Y School has implemented measures to help novice teachers internalize SCT explicit knowledge into tacit knowledge as personal knowledge which aligns with Kolb (1984). These measures include professional development through Learning Circle and administrative approaches like SCT lesson observation and teacher appraisal forms.

“To address the problem encountered by novice teachers, SCT Learning Circle, lesson observation and teacher appraisal forms were implemented. Novice and experienced teachers put the SCT principles into practice, evaluated their performance, and received feedback to internalize SCT

explicit knowledge into personal tacit knowledge. The shared language of the six principles made it easier for novice teachers to handle SCT classroom practices.”

(Y1)

Y School’s culture of mutual trust, collaboration, and collegial support provide a safe and conducive environment to enable teachers to turn SCT explicit knowledge into personal tacit knowledge through internalization. Collegial trust and a sense of security encourage novice teachers to take reasonable risks and try new things. The study confirmed that school leaders play a crucial role in supporting knowledge creation and fostering cultures of trust and risk-taking as suggested by Reid (2014).

“The collaborative working culture fostered by Learning Circle represents a high level of trust, where everyone engages in professional discussions. Our school provides a sense of security that makes us more willing to engage in positive knowledge behaviors.”

(Y6)

This findings confirm that Y School’s ability to achieve its knowledge vision depends on mobilizing SCT knowledge assets, especially the SCT tacit knowledge it possesses as an organizational learning. This tacit knowledge helps the school continuously improve its SCT pedagogical skills and competencies, as suggested by

Sohi & Matthews (2019).

4.3 The cross-case study of X School and Y School

4.3.1 The Influence of KM on the implementation process of SCT in School X and School Y

4.3.1.1 The reconceptualization of KM in School Context

Teaching and learning are the core functions in the school context, according to Du Plessis (2013) and Hong et al. (2014). As such, schools should prioritize organizing learning experiences to promote effective learning and growth of students, an idea supported by Cheng (2015a) and Cheng & Hu (2020).

Nonaka & Takeuchi (1995) state that “organization supports creative individuals and provides them with the conditions for creating knowledge”. School knowledge is developed through interactions that enable its creation by teachers and dissemination to the school later.

“Our principal suggests using SCT Learning Circle to make teaching a shared responsibility, and the effect was unexpected. The Learning Circle develops a culture of collaboration and trust, with everyone working together for the students’ learning. Teachers and Subject-panels comment that with the implementation of the Learning Circle, a deep sense of mutual trust, professional discussion, collaboration, and collective

improvement is witnessed. This has helped significantly in the process of SCT knowledge creation and transfer.”

(Y4)

The study finds that Y School’s implementation of KM initiative of personalization strategy with Learning Circle provides creative teachers with the crucial condition for capturing, reusing and creating SCT knowledge. KM enables SCT knowledge creation by fueling the dynamic and ongoing conversion between tacit and explicit knowledge. This aligns with Cheng’s (2019a) emphasis that the importance of KM, which involves capturing and reusing knowledge, as a means to save time and effort while enhancing school performance.

Implementation of KM facilitates school leaders and teachers to acquire and apply knowledge resources for effective teaching and learning. This study elaborated on KM’s meaning in the context of a school, defining it as a mechanism that facilitates three-tiered knowledge leaders to acquire, share, create, transfer, apply, and internalize knowledge and manage knowledge resources to equip teachers for effective lesson preparation and continuous teacher learning. This is achieved through SCT Learning Circle and responding deliberately and purposely to deal with the school’s challenges, which aligns with various studies such as Nonaka & Takeuchi (1995), Hansen et al. (1999), Zack (1999), Cheng (2015a), Cheng & Hu (2020), and

Tang (2021).

4.3.1.2 The Influence of Codification Strategies on SCT Strategic Analysis in X

School and Y School

Cheng (2019a) illustrates that the codification strategy involves storing, retrieving, and applying explicit knowledge recorded in school documents, such as teaching guides and lesson plans. Both X and Y Schools utilized this strategy to store and apply SCT knowledge into document formats like school records, lesson minutes, and teaching materials. This study confirms that the codification strategy can assist teachers in documenting and storing SCT explicit knowledge for retrieval in a “people-to-document” manner, as suggested by Gupta et al. (2009) and Kumar & Ganesh (2011).

Cheng (2015a) states that codification of teaching knowledge is a common strategy in schools. Both X and Y School have developed IT-based record management systems to store SCT curriculum documents, teaching guidelines, plans, and materials. Codification as an IT-dependent strategy, according to Andreeva & Kianto (2012), aligns with the case for both schools.

Liao et al. (2007) suggest that schools adopting the codification strategy must invest in an IT-based record management system. Both X and Y School invested resources to design a school-based IT system in their public servers, for storing,

retrieving, sharing, and applying documented SCT explicit knowledge. Teachers externalized their tacit knowledge into explicit knowledge and encoded it into a shared SCT knowledge database for easy access and retrieval by other teachers at both schools.

X and Y School use an IT-based approach to manage SCT knowledge, codifying, storing, and formally sharing SCT explicit knowledge. During the pandemic, teachers from both schools used Google Drive to exchange documented SCT knowledge as they attempted classroom teaching via Zoom while working from home.

Both X and Y School teachers build their digital archives or school-based taxonomy to facilitate SCT knowledge sharing, creation, storage, retrieval, transfer, and application. Although ICT are crucial, teachers were even more critical in designing a records classification system to ensure that each record is correctly classified and used for its original purpose, which aligns with Cheng (2019a).

“One difficulty is that retained teaching materials are not stored systematically, making it hard for novice teachers to retrieve and review past colleagues’ materials, hindering SCT knowledge creation and transfer.”

(X8)

“Establishing a digital archive is significant for implementing SCT. Clear

classification, subject division, and grading make it easy for colleagues to find SCT teaching plans, materials, and references, helping teachers adjust to students' learning diversity. This promotes SCT knowledge creation and transfer and saves teachers from starting everything from scratch."

(Y7)

The taxonomy of digital archives should follow the basic principles of systematic classification, as stated by Cheng (2019a). However, over a third of X School teachers report difficulty retrieving SCT teaching plans and materials due to a lack of understanding of taxonomy classification principles, which result in spending much time locating SCT knowledge.

Cheng (2019a) suggests a user-driven approach to establish the digital archives taxonomy for effective management of SCT explicit knowledge. Interview analysis and document review reveals that Y School's classification principles are more user-friendly for teachers, with systematic classification based on the school's organizational chart, which is widely recognized and owned by teachers.

Cheng (2019a) suggests that a school's records management under the codification strategy with digital archives supports teachers' decision-making on teaching and learning issues by making it easier to elicit information. The Y School's

more user-friendly records management system serves teachers better in crafting the SCT pedagogical strategy and managing documented SCT explicit knowledge more effectively.

Cheng et al. (2017) finds that codified knowledge exists in guidelines, handbooks, manuals, agendas, and minutes, capturing elements needed for overall school management to provide students with quality education. However, the SCT teaching manual was unused and lost in recent years in X School.

“The SCT teaching manual and guideline seem unused and missing in recent years.”

(X2)

Y School emphasizes the importance of combining the SCT knowledge into the SCT teaching manual, considering it a crucial vehicle for the school’s sustainable development, which differs from the situation at X school.

“We believe that SCT is crucial for our school’s development and has been integrated into our daily teaching. The school has developed a school-based SCT teaching manual, which Y1 shared with me.”

(Y3)

“I have read the SCT teaching manual, and we are accumulating SCT experience, which provides an advantage for the development of our

school.”

(Y9)

Y School management invests more effort than X School in developing and updating the SCT teaching manual. Interview data analysis reveals that effective knowledge leadership practices are critical. Teachers at Y School enjoy more confidence in mastering Galton’s six SCT principles in their classroom teaching compared to teachers at X School. This study suggests that good SCT teaching practices can be enhanced by schools encouraging professional dialogue and codifying good practices into documented SCT lesson plans and reports for dissemination.

4.3.1.3 The Key Personalization Strategies that were used to implement KM in the X

School and Y School

X School and Y School, as learning communities, can enhance social learning and provide a school context for documented records of explicit knowledge elicitation. Personalization strategies are crucial in providing a contextual background for SCT teaching materials and records, enabling teachers to use them with greater confidence.

“We utilize Galton’s six principles in our classroom practice and our teachers are confident and willing to participate, seeing the effectiveness

of Learning Circle in optimizing student learning.”

(Y9)

Through subject-departmental level Learning Circle, Y School teachers participate SCT knowledge creating pedagogical activities, codifying their teaching experience and tacit knowledge into updated SCT lesson plans, materials, and artefacts in the SCT teaching manual. This resulted in better retention of SCT knowledge in Y School than in X School.

4.3.1.3.1 How the SCT Learning Circle is developed and served as a Knowledge Creation Platform in Y School

Galton (2010a, 2010c) highly values Learning Circle’s effectiveness in promoting teacher learning in SCT and considers it crucial for facilitating their paradigm shift in pedagogy towards SCT implementation.

Nurturing a shared instructional repertoire for SCT teaching is challenging, requiring the professional growth of teachers as knowledge professionals and development of CoP (Lewis, 2009). Considering these difficulties, Y School implements SCT Learning Circle as major concern one of the school development plans since 2018-19 for the following reasons:

“Learning Circle aims to achieve the following goals:

(i) To construct and systematically disseminate the flow of practical SCT

knowledge in the school;

(ii) To encourage teachers to focus on teacher learning on classroom practices

to improve teaching and optimize student learning;

(iii) To provide an interactive context that promotes professional dialogue,

builds collegial trust and culture of collaboration.

(2022-23 Learning Circle Guideline of Y School, (p. 1))

“We believe in the effectiveness of Lesson Study, but as a primary school, we don’t have research team and resources for conducting Lesson Study.

Therefore, after discussing with the principal and PSMCD, we aim to implement SCT Learning Circle to achieve a similar level of professional effectiveness.”

(Y4)

In Y School, Learning Circle is a professional learning community where teachers under the professional support of Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y8, and Y9 come together to share their experiences, expertise, and best practices related to SCT. Although the Learning Circles are typically less structured than LS, the focus of Learning Circles is also on building a CoP where teachers can learn from one another and support each other in their SCT teacher learning.

Learning Circle, in general, is a less structured and systematic process than LS, involving a team of teachers working closely together to refine a specific lesson. However, both the Learning Circle and LS approaches can be effective in supporting teacher learning and improving student outcomes.

With an understanding of the effectiveness of LS and considering available resources, the Y4 modified the Learning Circle. The modification aimed to create a more structured and systematic ongoing learning process involving a team of teachers closely working together to refine a specific SCT lesson.

After these modifications, there are some important similarities between LS and the Learning Circles in Y School, such as their emphasis on the “PDCA” cycle, which includes collaborative lesson preparation, implementation, observation, and reflection.

Y School’s Learning Circle plays a critical role in supporting teachers’ ongoing teacher learning. SCT Learning Circle in Y School share a common goal with LS, fostering three types of development: enriching and refining practical subject content and SCT PCK, promoting interpersonal relationships and peer-learning, and encouraging personal qualities to improve SCT classroom practices and enhance student learning outcomes.

Y School places significant importance on SCT Learning Circle, highlighting their purpose of fostering teacher learning through professional dialogue and

interactive engagement.

“Teachers prepare SCT lessons and engage in professional dialogue to improve quality with mutual care and trust. They bring their opinions before preparing lessons and interact during the process.”

(2022-23 SCT Learning Circle Guideline of Y School, (p. 1))

SCT Learning Circle cultivate a high involvement and high care team atmosphere, which aligns with von Krogh (1998), enabling SCT knowledge creation among teachers at Y School.

Learning Circle serves as a valuable KM strategy and knowledge creation platform. Teachers actively engage in professional dialogue and interactive discussions to improve lesson quality. With this mindset, teachers enhance overall education quality with shared responsibility.

“Learning Circle is a important KM strategy at Y School, enabling teachers to share and create SCT knowledge, improving teaching effectiveness and student learning outcomes.”

(Y4)

Y2 highly values Learning Circle’ effectiveness in enhancing knowledge sharing and professional dialogue among teachers, considering it crucial for facilitating their

paradigm shift in pedagogy.

“Learning Circle is the primary KM measure in our school, promoting knowledge sharing and professional dialogue among teachers, enabling them to apply Galton’s six SCT principles to optimize student learning.”

(Y2)

The Learning Circle aims to promote effective SCT strategies and enhance students’ learning. Y School defines the purposes of Learning Circle as follows:

“Teachers form Learning Circle to collectively identify and solve teaching-related problems, improving learning effectiveness.”

(2018-19 LC Workshop PowerPoint Slide of Y School, (p. 3))

Implementing Learning Circle aligns with Y School’s knowledge vision, emphasizing teachers’ continuous teacher learning to promote student learning.

Initially, implementing Learning Circle faced challenges. However, the principal, vice-principals, and PSMCD explain its benefits to teachers. Y4 design a table chart comparing Teaching Exchanges and Learning Circle (See Table 4.4), emphasizing the latter’s focus on collective wisdom and co-constructing quality classrooms to enhance student learning.

Table 4.4 Compare Teaching Exchange (2017-18) and SCT Learning Circle (2018-19)

Comparison items	Teaching Exchange (17-18)	SCT Learning Circle (18-19)
Participants	same grade level/cross-grade	same grade level
Modes of communication	<ol style="list-style-type: none"> 1. Design lesson plans and resources individually. 2. Colleagues who teach the same topic share their ideas during the exchange meeting, and other colleagues provide feedback. 3. Colleagues who teach the same topic make revisions to their teaching on their own. 4. Other colleagues observe and evaluate the lesson. 	<ol style="list-style-type: none"> 1. Group members identify the learning difficulties of students related to the topic and collectively develop a teaching plan. 2. Group members share the work and collaborate to prepare relevant teaching resources. 3. Group members review and make revisions to the prepared teaching resources together. 4. Group members teach the same topic and open up the classroom observation for each other's. 5. Group members collectively reflect and review their teaching together. 6. Group members take turns to take meeting minutes.
Features	Individual accountability is the main focus	Collective wisdom, co-constructing quality classrooms for better student learning

(2018-19 Learning Circle Workshop PowerPoint Slide of Y School, (p. 9))

Y School's Teaching Exchange in 2017-18 was criticized for its ineffectiveness in facilitating knowledge sharing for novice teachers, failing to inspire them to improve classroom practices in SCT (See Table 4.4).

“Teaching Exchange through classroom observation involves individual work on lesson planning with other teachers coming to observe, creating an isolated working culture. This is stressful as the teacher worries about not doing well and receiving negative feedback.”

(Y5)

Collaborative lesson planning alone as a form of professional development also has its shortcomings.

“In collaborative lesson planning, novice teachers hesitate to make changes to the plan to accommodate class differences due to lack of professional confidence, resulting in following the teaching plan step by step, and becoming boring, particularly for novice teachers.”

(Y5)

This study’s findings indicate that Y School’s implementation of Learning Circle is more successful than X School’s implementation of Collaborative Lesson Preparation in terms of promoting SCT knowledge creation and transfer in their respective schools. Y School’s centralized knowledge leaders take SCT Learning Circle as an effective teacher learning and continuous professional development mechanism for novice teachers, providing professional training in SCT classroom practices to inspire and motivate teachers’ professional growth.

After clarifying misunderstandings about Learning Circle, Y4 and Y5 elaborate on working procedures and highlight the importance of Learning Circle (See Appendix seven), shown in Fig. 4.1, in facilitating the SECI process, promoting SCT knowledge creation and transfer at Y School.

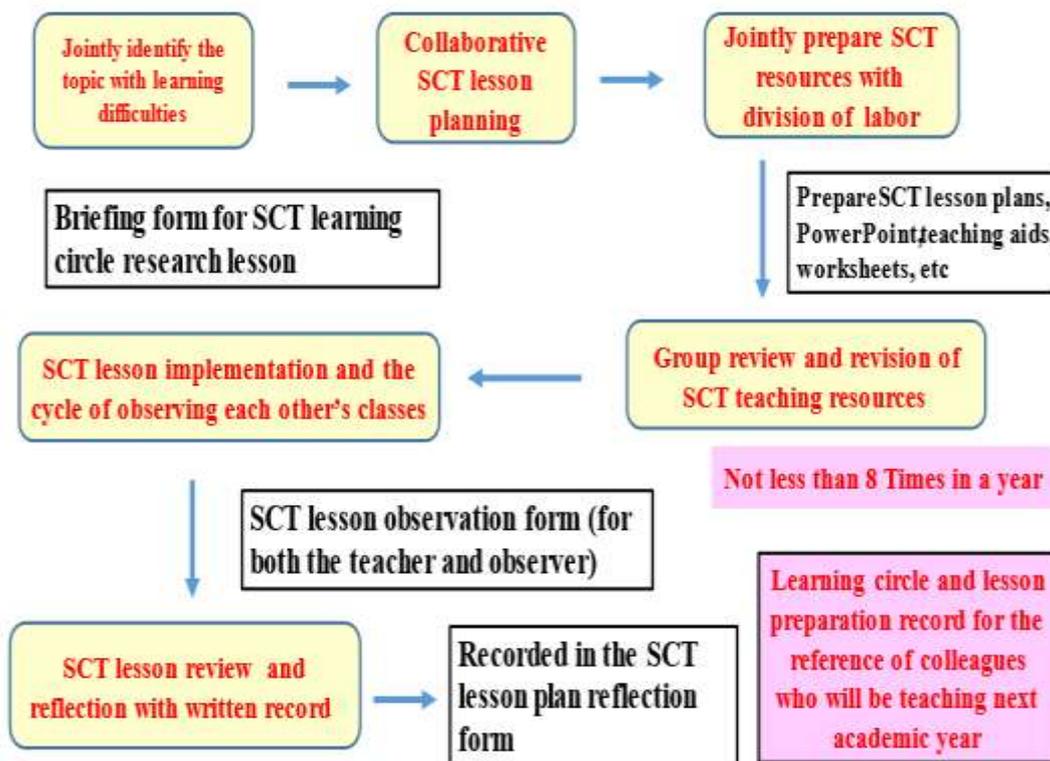


Fig. 4.1 The administrative arrangements and working procedures of the SCT Learning Circle in Y School. (2018-19 Learning Circle Workshop PowerPoint Slide of Y School, (p. 6))

Y4 and Y5 at Y School compared collaborative lesson preparation with the SCT Learning Circle (See Table 4.5) during a Learning Circle workshop. They emphasized the unique purpose of the SCT Learning Circle in achieving teaching consensus among teachers and fostering collective responsibility, as well as promoting positive professional interdependency among all knowledge leaders for accomplishing shared knowledge vision to maximize students' learning. The teachers collectively prepared, implemented, reflected on, and discussed SCT lessons to optimize student learning, achieving much better effectiveness than what collaborative lesson preparation alone can accomplish.

Table 4.5 Compare X School's 'Collaborative Lesson preparation' and with Y School's 'Learning Circle' (See Appendix eight)

Comparison items ⁴³	Collaborative Lesson Preparation ⁴³	SCT Learning Circle ⁴³
Participants ⁴³	usually, same grade level ⁴³	same grade level a must ⁴³
Frequency ⁴³	Not mandatory ⁴³	at least 8 times per year in Y School ⁴³
Content ⁴³	<ol style="list-style-type: none"> 1. Effective implementation of collaborative lesson preparation⁴³ 2. Group members take turns to keep records of collaborative lesson preparation so far as possible⁴³ 3. Lesson observation is not mandatory⁴³ 4. Keep record for the archives is optional.⁴³ 	<ol style="list-style-type: none"> 1. Group members identify the learning difficulties of students related to the topic and develop a SCT teaching plan.⁴³ 2. Group members share the work and collaborate to prepare relevant SCT teaching resources.⁴³ 3. Group members review and make revisions to the prepared SCT teaching resources together.⁴³ 4. Group members teach the same topic and open up the classroom observation for each other's.⁴³ 5. Group members collectively reflect and review their SCT teaching.⁴³ 6. Group members take turns to take meeting minutes to keep record in the SCT archives for the reference of colleagues who will be teaching next academic year.⁴³
Features ⁴³	Achieve basic teaching consensus ⁴³	Achieve teaching consensus, collectively prepare, implement, and reflect, and discuss the SCT lesson for optimizing student learning ⁴³

(2018-19 Learning Circle Workshop PowerPoint Slide of Y School, (p. 18))

In order to outline administrative requirements for Panel-heads and teachers at Y School, Y4 and Y5 of Y School design a table for better illustration on the administrative requirements for the implementation of SCT Learning Circle at Y School (See Table 4.6).

Table 4.6 The administrative requirements for the implementation of SCT Learning Circle at Y School

<ol style="list-style-type: none"> 1. Learning Circle record sheet should be done at least 8 times per year (record-taking should be rotated among members).⁴⁴ 2. The SCT teaching resources for each topic should be developed, completed, and shared with colleagues with clear division of labor among members.⁴⁴ 3. Teachers of the same grade level should collaboratively prepare the SCT lesson and teach the same topic (with at least one teacher observing the class).⁴⁴ 4. Teachers of the same grade level should have collegial lesson observation and make collective reflection on their teaching in post lesson observation review meetings.⁴⁴ 5. The groups participating in the SCT learning circle should share their teaching and research cases in subject panel meetings first and then in cross-subject sharing sessions whenever appropriate.⁴⁴

(2018-19 Learning Circle Workshop PowerPoint Slide of Y School, (p. 7))

The study shows that Y School's centralized knowledge leaders possess key attributes of transformational leadership qualities. Effective SCT knowledge leadership in promoting teacher learning within the school involves serving as a role model, promoting collegial trust, inspiring collegial learning, committing to school learning, encouraging knowledge sharing, nurturing a learning culture that allows mistakes, and leading teachers to master SCT knowledge application, storage, and transfer mechanism as suggested by (Gürlek & Çemberci, 2020).

In Y School, teachers are encouraged to share their SCT tacit knowledge, promoting its socialization among teachers and contributing to SCT Learning Circles' success. SCT tacit knowledge is externalized into explicit lesson plans, learning materials, review and reflection records, and teaching and research cases in written format. Cross-subject sharing sessions facilitate combining SCT knowledge during the process of school-level Learning Circle implementation. Collegial lesson observation and reflection in post-observation meetings provide a safe environment for novice teachers to internalize SCT explicit knowledge into their own tacit knowledge.

Interview data analysis shows that Learning Circle in Y School successfully transformed its working culture from isolated to collaborative, promoting knowledge

sharing and mutual trust.

“During the 2015-18 school years while using Teaching Exchange, teachers worked in isolation. However, Learning Circles established a regular time to collaborative work every week in a designated lesson preparation room, incorporating Galton’s six SCT principles into lesson preparation, observation, and review. Since 2018, Learning Circle has fostered a culture of knowledge sharing, mutual trust, and collaboration at Y School.”

(Y3)

Interview data analysis and lesson observation data analysis shows that Learning Circle create practical SCT teaching knowledge at Y School, evident in classroom instructional processes where teachers ask relevant questions, observe signals from students, and design suitable learning activities. Practical SCT knowledge challenges assumptions about teaching and learning, allowing for professional discussion (Cheng, 2019a).

“From 2018-21, we implemented teaching cycles using Learning Circle, promoting socialization, externalization, combination, and internalization of SCT knowledge. Learning Circle enabled teachers to learn more about SCT, encouraging student self-directed learning successfully within the circle.”

(Y10)

“The teacher guides students to use mind maps to retell stories, followed by

self-evaluation. Peer-evaluation among students is then conducted to improve learning efficiency.”

(2021 Learning Circle observation lesson plan, (p.3))

Both interviews and documentary analysis shows Learning Circle at Y School created a learning community, developing SCT PCK to facilitate interactive and student-centered learning in the classroom. The significance of content knowledge adaptations by teachers in Y School is underscored, as it supports their comfort level, enhances their perception of student’s competencies, promotes awareness of high-quality content inclusion, and facilitates the creation of innovative teaching resources for other teachers. These practices align with the findings of Cheng (2019a).

“Learning Circle is crucial for the practice of SCT, giving teachers professional confidence to adjust teaching content according to student needs, as SCT aims to optimize student learning.”

(Y11)

Successful implementation of SCT Learning Circle enriched teachers’ content knowledge understanding and professional confidence, empowering effective adaptation of SCT teaching plans and materials to address student learning needs. Y5 shares her insight on the significance of Learning Circle.

“Learning Circle connects subject matter content knowledge, pedagogical

competence, and real-life application in school, checking knowledge creation point and line to plane in the classroom instructional process with involved teachers.”

(Y5)

Learning Circle involved teachers’ in-depth reflection and professional dialogue in different Learning Circle phase and cycles helps integrate SCT knowledge and extend pedagogical understanding of teaching methods in SCT classroom practices.

“During Learning Circle cycles, we create SCT lesson plans, take turns teaching, and hold post-class review meetings to consolidate and improve classroom practices. We record our reflections and share SCT knowledge content with colleagues in cross-level subject meetings and cross-subject sharing sessions organized by the PSMCD to promote sharing, cross-subject collaboration, and eventually help updating the SCT teaching manual.”

(Y6)

The study suggests that SCT Learning Circle at Y School helped de-contextualize, re-contextualize, and apply SCT knowledge among teachers and across different subjects. SCT Learning Circle provides learning support, facilitating SCT learning materials development and re-contextualizing SCT knowledge for use in classroom contexts.

Teachers, Core subject-panel Heads, and middle managers suggest that an updated SCT teaching manual is essential for SCT classroom practices. The manual externalizes SCT tacit knowledge into explicit knowledge, including reasons for pedagogical choices. It provides context for other teachers to learn from documented records for explicit knowledge elicitation.

Teachers at Y School, including novice teachers, Subject-panel Heads, Y2, and Y4, and Y5, agree that the school excels in KM measures, particularly the Learning Circle. SCT Learning Circle promotes collaboration among teachers and serve as an essential knowledge creation platform. Y1 emphasizes teacher empowerment and promoting professional autonomy coupled with accountability to the school community, especially parents, due to demographic changes from a decrease in birth rates and student exodus.

Y1 expects teachers to create SCT PCK by practicing, clarifying, and reviewing practical wisdom through collaborative classroom endeavors and lesson practice via SCT Learning Circles.

“Collaborative lesson design through SCT Learning Circle is important because it allows colleagues to assess their students’ abilities and needs during discussions. This helps teachers practice and adjust their teaching strategies to better meet their students’ learning needs.”

(Y1)

At Y School, teachers shared their SCT tacit knowledge and re-contextualized SCT knowledge to design lessons and help each other learn. Y5 also share the frontline experience.

“SCT knowledge, created during the implementation of SCT Learning Circle, along with professional dialogue and reflection, was documented in lesson plans and materials for the next cycle of knowledge creation and transfer. By internalizing SCT knowledge through lesson practices, we feel more competent in our professional knowledge and believe that together, we can make a difference in students’ learning.”

(Y5)

The Learning Circle serves the same purposes as LS, which is a model for teacher learning and collaboration, professional learning communities, and knowledge creation (Cheng, 2019a). The Learning Circle provides an important platform for teachers’ professional dialogue and continuous learning. Teachers believe that the Learning Circle enables them to exchange teaching views, gain a better understanding of key PCK, identify teaching difficulties, and address students’ learning challenges. This belief aligns with the findings of Lewis et al. (2009), who argue that LS improves instruction through three pathways: changes in teachers’

knowledge and beliefs, changes in the professional community, and changes in teaching-learning resources.

The SCT Learning Circle provides a platform for teachers to observe each other's lessons and engage in peer discussion during post-lesson reviews. This professional dialogue helped construct high-quality teaching and enhance learning effectiveness. Interview findings of Y1, Y2, Y3, Y4, Y5, Y6, Y8, Y7, Y9, Y10, Y11, Y12 and Y13 show that they all agree that the SCT Learning Circle promotes mastery of SCT and confidence in integrating Galton's six SCT principles into their instructional skills.

Participation in the Learning Circle at Y School allows teachers to enhance their understanding of students and their individual needs. By engaging in the learning circle, teachers develop a heightened awareness of students' prior knowledge and become more intentional in analyzing the learning objectives of SCT lessons in relation to their students' existing knowledge.

According to Jankingthong & Rurkkhum (2012), Learning Circle can effectively enhance contextual performance in SCT implementation through interpersonal facilitation, such as collaborative behaviors, and job dedication, such as self-motivated and disciplined behaviors that support the school's vision and mission.

“As educators, including the principal, vice-principals, PSMCD, Panel

Heads, and teachers, we cherish our students and strive to promote their learning through Learning Circle. This collaborative culture is based on shared responsibility and a willingness to work together to improve. We have mutual trust and respect and proactively consider each other's professional development needs.”

(Y4)

Teachers at Y School, encouraged by the centralized knowledge leaders, not only developed high-quality resources in the Learning Circle for daily teaching but also use them to participate in external programs and share their experiences to promote further professional growth.

“Encouraged by the principal, vice-principals, and PSMCD, I shared Math. knowledge developed in the Learning Circle with partner schools to receive professional feedback. Based on this feedback, we will optimize the SCT Math. knowledge for our school.”

(Y8)

The knowledge leaders at Y School, including the principal, middle managers, and teachers, work together to cultivate the operation of PDCA cycles of the Learning Circle under the SECI model for SCT knowledge creation and transfer. This builds IC and creates competitive advantage for sustainable development.

4.3.1.3.2 The SCT Learning Circle is developed and served as an Access and Path towards KM and Knowledge Creation in Y School?

SCT Learning Circle at Y School is developed to serve as a means of access to KM and a path towards knowledge creation. Teachers work in teams to plan, do, check, act, and research SCT lessons to enhance teaching and learning continually.

Y School's teachers acquire SCT knowledge from digital archives and inter-school learning communities, designing SCT lesson plans, experimenting with PCK, reviewing experiences in group meetings, and sharing successes with peers. SCT knowledge is documented in lesson plans, teaching materials, panel records, and meeting minutes.

The implementation of the SCT Learning Circle at Y School involves knowledge retrieval, sharing, application, storage, and creation. Amid the COVID-19 pandemic, the effective use of the Learning Circle, which serves as a knowledge creation platform, can optimize learning and teaching strategies, promote student engagement, and ensure interactive classroom learning. The Learning Circle also promotes teacher learning and gives teachers a sense of achievement in their careers.

During the COVID period, the SCT Learning Circle also focuses on developing Technological Pedagogical Content Knowledge. This knowledge equips Y School's teachers with the necessary skills to effectively integrate technology into their

teaching across various content areas. By employing appropriate pedagogical methods and technology, teachers can enhance their teaching practices. This approach aligns with the insights provided by Cheng (2019a).

“During the pandemic, online teaching has greatly advanced, shifting the mode of instruction from teacher-led to student-led learning. For example, incorporating VR/AR elements into certain school-based content for Chinese and English subjects can enhance students’ learning interest and effectiveness.”

(2021-24 School Development Plan, (p.15))

SCT Learning Circle also adopts “PDCA” cycle, involving teacher teams planning, doing, checking, acting, and researching SCT lessons to codify tacit knowledge into explicit knowledge for dissemination, aiming to enhance learning and teaching (Cheng, 2015).

“Through the cyclic observation process within the Learning Circle, we record observations, follow up with trial teaching and professional discussions for the next round. SCT tacit knowledge becomes explicit through externalization, and practical application in the Learning Circle internalizes it into personal tacit knowledge.”

(Y10)

During the “Planning” cycle of the subject-departmental Learning Circle, Y School teachers share tacit knowledge in collaborative preparation periods organized by Subject Panels and Form Coordinators, codifying it into explicit teaching knowledge in lesson plans and teaching materials as suggested by Cheng (2019a). Teachers experience SCT knowledge creation and management process during collaborative lesson design and preparation.

During the “Do” cycle of the Learning Circle, Y School’s teachers apply SCT lesson plans and are observed by peers. This cycle provides opportunities for teachers to apply explicit PCK in a safe and positive classroom environment with peer support and positive expectations, internalizing the knowledge through teaching practices.

“With the support of the Learning Circle, novice teachers work hard to master SCT knowledge, knowing colleagues will share and teach them. The collaborative team fosters mutual trust and security, designing teaching materials together to increase ownership and effectiveness in student learning, leading to a higher sense of teaching success and achievement for teachers.”

(Y11)

The “Check” cycle of the Learning Circle checks for success and allows for continuous self-improvement, co-constructing tacit PCK among teachers in a non-

threatening way, and saving it as SCT lesson plans and learning materials in digital archives for future reuse in classroom activities.

The “Act” cycle in the Learning Circle provides opportunities for teachers to implement improved SCT lesson plans and updated learning materials in their classes, beginning a new cycle when encountering new challenges or identifying learning difficulties. The PDCA cycle applies at the individual, departmental, and school levels.

“Math. teachers at our school join SCT Learning Circle, preparing lessons together weekly. Within the Learning Circle, we take turns observing and learning from each other’s classrooms, designing and practicing lessons together, and discussing how to improve for the next round. This cycle fosters collaboration among Math. teachers, improving teaching and making the panel development and management more effective.”

(Y12)

The Learning Circle at Y School facilitates codification and personalization strategies for retaining, sharing, creating, and storing SCT PCK through knowledge-sharing mechanisms and a creation platform. Y1 intends to use the Learning Circle for teacher learning to acquire, share, create, capture, and codify SCT PCK across subjects, aiming to enhance classroom instruction practices and promote school-wide

improvement.

“Teachers share SCT tacit knowledge and conduct knowledge sharing within and across subject panels at the end of each semester, jointly creating important knowledge assets for the school development and promotion, and ultimately attracting P1 intake.”

(Y13)

During SCT Learning Circle cycle, Y School teachers codify tacit knowledge into explicit knowledge, externalizing it into teaching plans, lesson materials, and an SCT teaching manual, saving and sharing it through Google Drive and the school’s servers which aligns with Yi (2006) and Khan & Khader (2014).

Y1 emphasized the importance of middle managers’ knowledge leader’s role in leading the SCT Learning Circle, particularly Panel Heads, Vice-panel Heads, and Form Coordinators in re-contextualizing codified SCT knowledge into tacit knowledge during the design cycle. Middle managers play an essential role in SCT knowledge sharing and creation at the departmental level.

“The principal intentionally assigns Panel Heads, Vice-panel Heads, or Form Coordinators with strong abilities to lead collaborative lesson planning sessions, passing on SCT knowledge and experience. The Panel Heads appreciate the arrangement, and senior teachers effectively lead and

nurture novice teachers in formal and informal SCT sharing.”

(Y3)

In Y School’s SCT Learning Circle, middle managers as knowledge leaders share their experience in leveraging SCT knowledge through mutual engagement and a shared knowledge base. They share SCT tacit knowledge, discover and create pedagogical skills, and enact teaching plans and materials into classroom practices together with novice teachers.

“This school is about collaboration, with experienced teachers committed to helping and working with novice teachers to teach children well, a rare and admirable trait.”

(Y5)

Middle managers at Y School support a bottom-up approach of Learning Circle, believing enforced top-down approaches hinder SCT Learning Circle development as a joint enterprise.

“Middle managers, including the Prefect of Studies and Subject-panel Heads, enhance communication between teachers and management, promote reflection on SCT classroom practices, improve planning, and provide encouragement to reinforce confidence among novice teachers. The school employs a soft strategy that involves professional discussions and

respects professional autonomy, rather than relying on administrative directives.”

(Y4)

Y1’s centralized knowledge leadership practices, such as building shared knowledge vision with delegation and empowerment of teachers, drive the sharpening and framing of common values and purposes in Y School.

“Empowerment thrives in a trusting culture. SCT Learning Circles at Y School foster professional development and a positive cycle of student learning. Subject-panel Heads experience empowerment through trust. I want to promote a culture of trust, ensuring a safe environment, offering administrative support, and respecting teachers’ sense of ownership and professional autonomy. The balance between distributed and centralized leadership is maintained, empowering Subject-panel Heads as middle managers to exercise a situational role in achieving the shared knowledge vision of optimizing student learning through SCT.”

(Y1)

Interview data analysis reveals that centralized knowledge leadership at Y School enhance collegial trust and mutual respect among teachers, promoting interaction and learning for student and school benefit which aligns with Cheng’s

(2019a) argument that establishing relationships of trust and respect leads to proactive preparation for effective community interaction. A Y School novice teacher stated:

“Mutual trust among teachers at Y School fosters ownership and shared responsibility for providing feedback and working together to teach well, all for student learning as per the knowledge vision, motivating teachers to teach with enthusiasm.”

(Y12)

Y School teachers are working hard and learning continuously in Learning Circle, sharing tacit knowledge and useful information, and having professional autonomy and shared accountability to manage SCT knowledge for common instructional problems. They explain:

“Together, Y School teachers plan, do, check, and act lesson plans and learning materials, sharing responsibility for classroom teaching and refining SCT pedagogical strategies and instructional repertoire.”

(Y10)

The Core Subject-panel Heads share that Y School is a high-trust school organization, allowing for the development of professional autonomy and a culture of mutual engagement and shared accountability. Teachers, middle managers, and the

principal of Y School all shared this perception of the school's high-trust environment.

“The principal committed to develop a collaborative work culture, which has also become a characteristic of the school. Under this collaborative culture, the relationships among our colleagues are good, which greatly helps to establish a high-collegial trust relationship.”

(Y6)

Y School's shared SCT instructional repertoire and digital archives help teachers cope with SCT policy and knowledge challenges. Learning Circle facilitate SCT knowledge creation, enhancing pedagogical competencies and student learning. Leveraging and disseminating SCT knowledge can enhance individual teachers', subject-departmental, and school's capacity to address SCT implementation problems.

This study identifies that the SECI knowledge creation process, within the “PDCA” cycle for the Learning Circle at individual, departmental, and school levels, facilitates teacher learning and optimizes student learning. The implementation of Learning Circle, guided by the SECI knowledge creation model, helps to develop effective SCT pedagogy and strategies by leveraging tacit and explicit knowledge to address SCT implementation gaps at the classroom, departmental, and school levels.

The study identifies a three-tiered knowledge creation process: at the classroom instructional level, where teachers and Form Coordinators share and create SCT

knowledge during Learning Circle meetings; the middle managers' documentation of SCT knowledge into explicit form through teaching plans, materials, and records at subject-departmental level; and the subsequent stages of knowledge combination and dissemination at school level by centralized knowledge leaders.

At the departmental curriculum management level, Core subject-panel Heads utilized Learning Circle to develop SCT PCK specific to their subjects. The centralized knowledge leaders and middle managers at Y School acknowledge the vital role played by subject-departmental PDCA cycles, Subject-sharing Sessions, and Interdisciplinary Sharing Sessions in combining SCT knowledge for the sustainable development of the school.

School-level Learning Circle focus on developing skills and competencies aligned with the school's mission, fostering self-learning experiences for students' lifelong learning. Core subject-panel Heads and middle managers were dedicated to conducting Reading across the Curriculum program and activities, believing in their effectiveness in nurturing students' reading skills and fostering self-learning and lifelong learning. These efforts also aimed to enhance the school's knowledge vision.

Y School's success can be attributed to a shared knowledge vision, where subject-departments' prioritize the holistic needs of students and employ system thinking to emphasize collaborative and dynamic relationship among departments.

This approach aligns with the arguments presented by Senge (1990). To facilitate the merging, transfer, and application of departmental PCK on reading to other departments, Y4, Y5, together with Chinese department played a crucial role. This is made possible through the shared knowledge vision that nurtured system thinking among teachers, Core subject-panel Heads, and middle managers, as revealed by interview data analysis.

4.3.2 The operation of SECI Model that facilitate the effective SCT implementation

Research findings indicate that the SECI framework provides a strong, dynamic, integrated, and systematic roadmap for ongoing SCT knowledge creation. Learning Circle promotes SCT by integrating Galton's six principles into daily classroom practices. Socialization occurs through sharing tacit knowledge among teachers, which is transformed into explicit knowledge through externalization in subject-departments. Cross-subject and interdisciplinary Sharing Sessions combine SCT explicit knowledge, refining teaching designs. Collegial lesson observation and individual lesson implementation lead to internalization, internalizing SCT explicit knowledge into personal tacit knowledge.

Learning Circle, using the SECI model, is both an effective KM personalization strategy and codification strategy, facilitating SCT knowledge creation and transfer and directing SCT PCK creation and instructional activities in the classroom.

Attention must be paid to all four phases and their required *Ba* context. The study reveals that the socialization stage is crucial for the teacher learning of novice teachers and the successful implementation of SCT. However, this stage has been underexplored. Additionally, the combination stage has been ignored in HK schools, which hampers knowledge creation and transfer.

The study suggests that the SECI model can be utilized to explain the process of integrating individual SCT tacit knowledge into subject-department and school-level knowledge under the effective three-tiered knowledge leadership. The SECI model offers an effective analytical framework for comprehending how the Learning Circle can be employed to facilitate the management of school SCT lesson plans and curriculum. Based on the findings, the study recommends the adoption of the Learning Circle and the SECI model in primary schools as a means to implement SCT (please refer to 4.6).

4.3.2.1 How the SECI Model creates SCT Pedagogical Content Knowledge

The SECI model is effectively adopted to analyze SCT knowledge creation and transfer at all levels in education which aligns with the insight provided by Cheng (2019a) , Farnese et al. (2019) and Xue et al. (2020), exploring centralized, situational, and distributed knowledge leadership practices, knowledge assets, SECI process, and the four *Bas*. Their effects on institutionalizing the SECI approach for developing

SCT PCK in HK primary schools are examined in section 4.6.

4.3.2.2 Reviewing the use of Nonaka Knowledge Creation Theory in HK primary school context

HK schools must adopt the SECI approach for sustainable development, acquiring and utilizing skills and knowledge, in line with Ozmen's (2010) findings. This is essential to remain competitive and address external challenges such as declining birth rates and student exodus. Establishing an effective KM system to create knowledge assets, along with innovating educational practices to manage rapid changes, becomes crucial for school renewal. This research offers evidence-based fieldwork by applying the SECI approach to investigate and illuminate SCT knowledge creation in primary schools.

This study reveals that establishing a dynamic and ongoing KM system can convert SCT tacit knowledge into explicit knowledge and vice versa, building a school's knowledge assets for improved student learning and school development.

“Since 2018, we have utilized the Learning Circle, aiming to increase teachers' SCT knowledge and encourage self-directed learning among students, promoting both student learning and school development.”

(Y10)

The study suggests that school leaders should approach strategic planning,

school design, and leadership practices from a knowledge creation perspective. The findings of this study demonstrate that Nonaka & Takeuchi's (1995) theory serves as a paradigm for managing school knowledge creation processes, which aligns with insights provided by Cheng's (2023a) research. The SECI model, which emphasizes continuous dialogue and dynamic interaction between SCT tacit and explicit knowledge, can facilitate the SCT knowledge creation process.

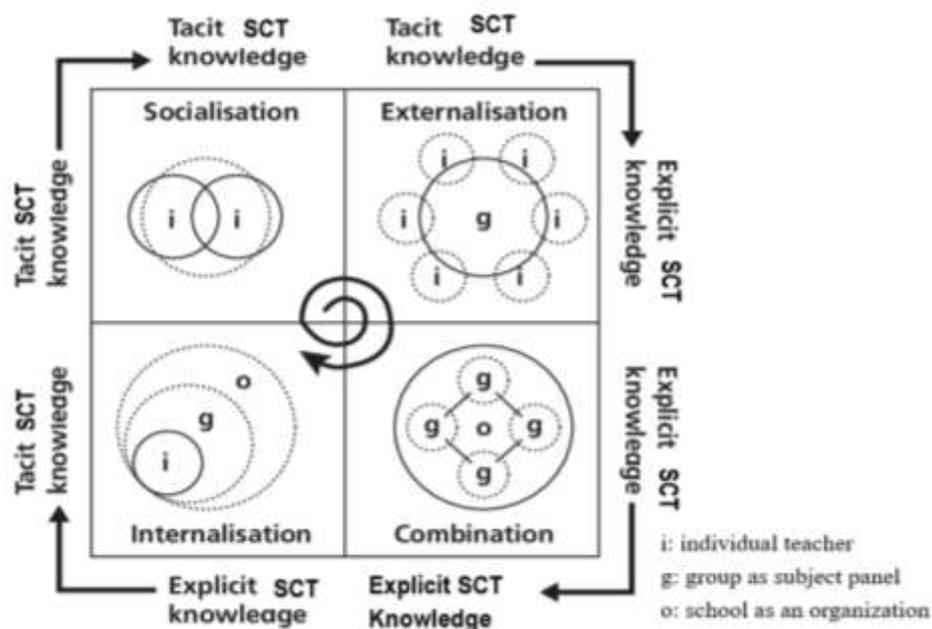


Fig. 4.2 The SECI knowledge conversion model Adapted from (Nonaka & Konno,1998, p. 43; Cheng, 2019a, p.30)

This model is the basis for SCT knowledge creation at various levels in schools (See Fig. 4.2) suggests that the SCT knowledge is dynamically created and continuously improved when it flows between different levels of the school and across teachers and departments as suggested by Hosseini (2011). All four phases of

the SECI model (See Fig. 4.2) must be fulfilled for successful SCT knowledge conversion within and across school organizations.

The ontological dimension shows the SCT knowledge creation process at the individual teacher, subject-departmental, and school levels. The citation below explains how SCT knowledge is converted from an individual teacher to the English panel and ultimately to the school community using the SECI conversion process.

“After completing the subject-departmental Learning Circle, we discuss and review feedback at the subject level, integrating SCT knowledge from different grade levels and discussing it at the English department level. School-wide cross-disciplinary meetings are held annually to discuss the effectiveness of Reading across the Curriculum and accumulate knowledge assets at school level.”

(Y11)

The SECI approach can be widely used as the leading framework for knowledge creation in schools, revolutionizing thinking about them as social learning systems.

4.3.2.3 SCT Knowledge Creation Spiral: Swinging between two Epistemological states and processing among School multi-Ontological levels

Examining the SCT knowledge creation and transformation process requires considering the epistemological and ontological dimensions and their relationship.

This study suggests that SCT knowledge creation involves ongoing dialogue and conversion between tacit and explicit knowledge at different ontological levels, including the teacher, departmental, school, and inter-school levels, aligned with the Nonaka & Takeuchi's (1995) SECI model.

SCT explicit knowledge, the visible part of an iceberg, can be codified and transferred through formal language, according to Farnese et al. (2019). Nonaka & Peltokorpi (2006) note that explicit knowledge is easy to articulate and codify. Examples of SCT explicit knowledge include school publications, lesson preparation records, peer-lesson observations records, teaching manuals, learning materials, and databases. SCT explicit knowledge is objective and easily codified information that can be transmitted formally in language.

SCT tacit knowledge is hard to express in language and difficult to codify. Nonaka & Peltokorpi (2006) suggest that tacit knowledge is hard to articulate and is linked with know-how. Ozmen (2010) argues that it is hard to capture because it depends on individual experiences, intuition, and personal judgment.

Tacit knowledge provides a competitive advantage and is a strategic knowledge asset for Y school which aligns with Nonaka & Takeuchi (1995) and Ozmen (2010). In Y School, SCT tacit knowledge plays a crucial role in problem discovery and contextual understanding and is the glue that holds all SCT knowledge together as

suggested by Collins (2001) and May (2008). Thus, tacit knowledge is regarded as more fundamental than explicit knowledge.

However, Nonaka (1994) proposes that tacit and explicit knowledge are complementary and interact in a spiraling process of knowledge creation. The social interaction between SCT tacit and explicit knowledge creates and expands SCT knowledge as suggested by Nonaka & Takeuchi (1995). In Y School, the teacher-to-teacher interactions drive changes in SCT pedagogical activities and instructional material preparation through the implementation of Learning Circle.

The study shows that that SCT knowledge expands through social interaction between SCT tacit and explicit knowledge which aligns with the SECI model and the insight provided by Cheng (2019a). The study confirms that SCT knowledge involves both tacit and explicit knowledge in the epistemological dimension. The SECI process also illustrates the conversion between SCT tacit and explicit knowledge.

“Senior and new teachers can share their SCT tacit knowledge via professional dialogue and interaction. SCT tacit knowledge can be externalized into SCT explicit knowledge through subject team and combined through cross-disciplinary meetings, resulting in shared documents, teaching materials, and PowerPoint presentations”

(Y2)

SCT knowledge creation is identified as a dynamic process involving teachers' sharing and applying SCT knowledge in classroom practices, and cyclic conversion of SCT tacit and explicit knowledge (See Fig. 4.3 and Fig. 4.4.)

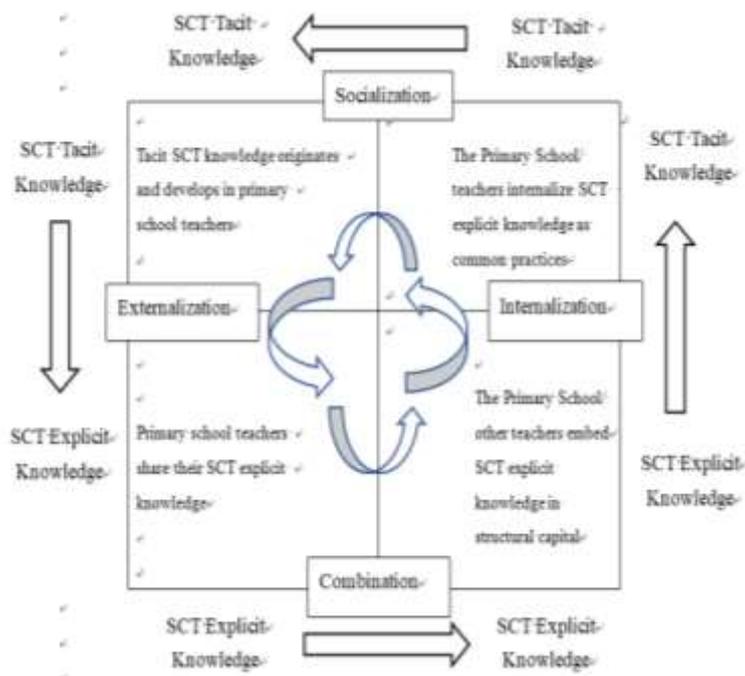


Fig. 4.3 Nonaka’s SECI model in the school context of SCT adapted from (Cheng, 2015, p.16)

<p>Socialisation⁴¹</p> <p>Individual teachers share their views on SCT goals and transfer useful SCT tacit knowledge and pedagogical skills in Learning Circle for developing SCT lesson plans that can be adapted into their practice.⁴²</p>	<p>Externalisation⁴¹</p> <p>Each core-subject department holds Learning Circle meetings to articulate SCT tacit knowledge into explicit knowledge and codified in its departmental SCT teaching and learning plans regarding the subject-level SCT teaching objectives.⁴³</p>
<p>Internalisation⁴¹</p> <p>Teachers analyse and absorb the collective SCT explicit knowledge in the SCT Learning Circle and prepare SCT lesson plans, thus internalising the SCT explicit knowledge through teaching practices into personal mastery of SCT tacit knowledge as common practices.⁴²</p>	<p>Combination⁴¹</p> <p>Converting SCT explicit knowledge from departments and combined it into the school-level SCT explicit knowledge, which will be documented as school's structural capital and distributed to individual teachers for implementation.⁴²</p>

Fig. 4.4 The SECI SCT Pedegogical Creation Cycle adapted from (Cheng, 2023a, p.

13)

The SECI model depicts a two-dimensional matrix in Fig. 4.3 and Fig. 4.4, which presents four possible scenarios for the interaction or transformation of tacit and explicit knowledge within the context of SCT. The model comprises four distinct knowledge conversion processes: socialization, externalization, combination, and internalization. These processes form a continuous cycle of SCT knowledge conversion that progresses in an upward spiral. By employing these four modes of SCT knowledge conversion, teachers at Y School is found to foster a dynamic process that enables the retention, transfer, and creation of SCT PCK to bridge the implementation gap in SCT.

Interview data analysis shows that SECI knowledge conversion modes require different knowledge leadership styles. Findings suggest that transformational leadership works well for socialization, externalization, and internalization, while transactional leadership is more appropriate for combination.

“As a principal, I lead teachers to develop a shared knowledge vision and value situational leadership among Subject-panel Heads and vice-panel Heads, and distributed leadership among teachers. I provide them with space to make professional judgments and establish a KM system within our collaborative framework. Teachers describe my leadership as transformational, empowering them to come up with their own ideas and

strategies that align with our shared knowledge vision. My aim is to cultivate a cultural change towards a collaborative work culture based on trust, moving away from individualism.”

(Y1)

“Our principal promotes the application of SCT knowledge across subjects by appointing the Chinese subject-panel head as PSMCD and providing teachers with personal encouragement and a space to showcase their work. These actions align with transactional leadership traits by providing rewards for encouraging PSMCD in combining cross-departmental knowledge.”

(Y4)

The study on Y School’s principal’s knowledge leadership can serve as role models for their employees by actively participating in personal development initiatives, as suggested by Viitala (2004). Knowledge leaders at Y School motivate teachers to advance their personal and professional growth, especially through the Learning Circle.

Y1 demonstrates knowledge leadership by promoting collegial learning, facilitating access to knowledge, valuing knowledge sharing and transfer, mentoring

teachers, and allowing mistakes. These attributes align with the recommendations of Sadler (2003), Williams & Sullivan (2011), and Farrell & Coburn (2017).

Y School’s knowledge assets facilitate the SECI mechanism for SCT knowledge creation and transfer. Fig. 4.5 illustrates about the four categories of SCT Knowledge Assets in Y School.

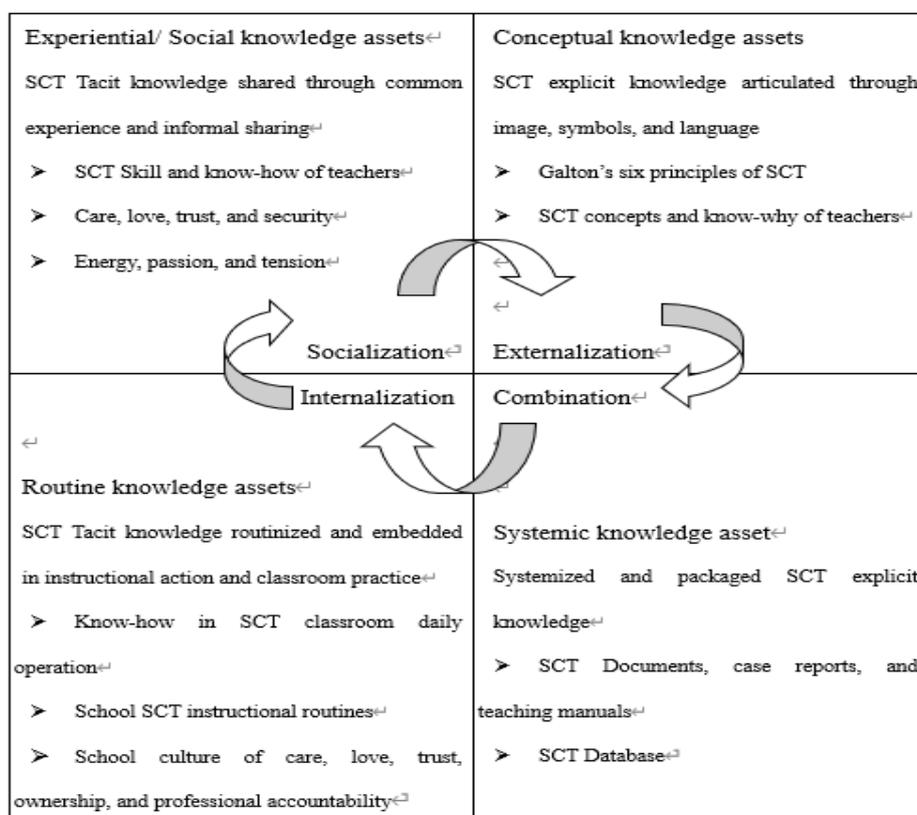


Fig. 4.5 Four categories of SCT Knowledge Assets in Y School adapted from Nonaka & Takeuchi (1995)

According to Cheng (2019a), school knowledge assets include teachers’ competencies, effective policies and structures, positive sharing culture, collaborative working culture, and partnerships with parents. Y School’s knowledge assets, listed in Fig. 4.5, were created through the ongoing conversion of SCT tacit and explicit

knowledge via the SECI mechanism.

Y School improve its capacity by managing and creating SCT knowledge by recognizing and utilizing its valuable knowledge assets. This dynamic process leads to innovative breakthroughs and improve education standards for students. Cultivating a collaborative environment that promotes knowledge sharing allows Y School's knowledge assets to expand continuously, maintaining its competitive advantage and attracting more student enrollment.

As a knowledge-creating school, *Ba* is crucial for Y School as it supports the process of knowledge creation and provides the driving force for self-transcending processes on individual, subject-departmental, and school levels. *Ba* serves as a platform for teachers to connect and share ideas.

Nonaka & Konno (1998) identify four types of *Ba* that correspond to the four stages of the SECI model, supporting a particular conversion process and speeding up the process of knowledge creation.

Nonaka & Konno (1998) propose that originating *Ba* is a physical place where individuals share feelings, emotions, experiences, and mental models with a high level of trust. Y School has designated a lesson preparation room specifically for Learning Circle, which allows for regular collaborative work to take place every week. This room serves as an originating *Ba*, facilitating face-to-face meetings

among teachers and enabling them to share their SCT experiences. The school has successfully established a high-trust environment where individual teachers feel safe to share their SCT knowledge. This environment encourages open communication and empathy among teachers, facilitating the conversion and transfer of SCT tacit knowledge.

Both X School and Y School provide arrangements for informal sharing and interaction among teachers. Y School's Newly Appointed Teacher Mentoring Program is more comprehensive, incorporating the Planning, Implementation, Evaluation- next Planning cycle with a built-in self-improvement mechanism.

“Teaching mentors guide newly appointed teachers in academic and pedagogical aspects through class observations and reflection, recorded in their learning portfolios.”

(2022-23 Newly Appointed Teacher Induction Program Handbook of Y School, (p.2))

“Newly appointed teachers are paired with same-grade and subject teaching mentors, providing opportunities for classroom teaching practice and professional growth.”

(Y10)

Y1 spent over 7 years intentionally establishing a highly trusting relationship between teachers and management.

“I spent 7-8 years creating a highly trusting work culture, resulting in a strong culture of collaboration and sharing among teachers, subject-panel heads, PSMCD, and vice-principals.”

(Y1)

“As a newly appointed principal, trust relationships are still being established, I have not yet arranged to participate in lesson observation and post-lesson review discussions due to this reason.”

(X1)

X1 had served for less than two and a half years at the time of conducting interview, making it unrealistic to establish a high-collegial trust among teachers. On the other hand, Y1 spent more than seven years to foster a culture of safety and trust. Y School encourage teachers to explore new pedagogical approaches and view mistakes as valuable learning opportunities. Y School is perceived as a place where trust, care, and commitment are emerging among teachers, middle managers, and the principal.

“As a novice teacher, I discuss teaching arrangements with subject-panel heads, PSMCD, vice-principals, and even the principal. They often say,

“Go ahead and try it out. The school trusts and supports you to try new things.””

(Y13)

Organizational factors, such as knowledge vision and culture, are related to originating *Ba*. School knowledge leaders of Y School play a vital role in promoting the culture of knowledge sharing by involving teachers and cultivating a trusting environment as suggested by Reid (2014).

Nonaka & Konno (1998) propose Dialoguing/interacting *Ba* as a consciously constructed space where teachers engage in collective reflection and professional dialogue to create meaning and value. Professional dialogue articulates tacit knowledge into explicit knowledge. Y5 emphasizes the importance of safe, peer-to-peer professional dialogue during SCT lesson design, execution, observation, and review. Professional dialogue clarifies SCT concepts and pushes for externalization of tacit knowledge.

“We are successful in building a high-collegial trust working environment, Subject-panel Heads can improve novice teachers’ teaching in a culture of trust, collaboration, and professional dialogue.”

(Y5)

X and Y schools promoted teacher-to-teacher dialogue through term-end sharing

and professional development programs. They also provide scheduled time slots and meeting rooms for collaborative lesson preparation. Y School goes further by arranging common time slots for lesson observation and offering class-substitution arrangements to encourage participation in the open-lesson of the SCT Learning Circle.

Nonaka & Konno (1998) propose Cyber/systematizing *Ba* as a virtual space for interaction during the combination phase. Online networks like servers/Google Drive and groupware like WhatsApp/Signal convert SCT explicit subject-departmental knowledge into more usable explicit school knowledge. This is crucial for transforming SCT knowledge into a school knowledge asset. Cyber/systematizing *Ba* integrates SCT knowledge systematically, eliminates contradictory knowledge, and creates a comprehensive school SCT knowledge system.

Y School had a well-articulated shared knowledge vision supported by stakeholders. Teachers commit to the school's knowledge vision and develop system thinking among distributed knowledge leaders, making SCT explicit knowledge more efficiently supported in Y School than X School. Learning Circle is major concern one in Y School's 2018-21 and 2021-24 school development plans, with whole-school SCT workshops and term-end Learning Circle sharing sessions accommodating inter-departmental SCT knowledge combination.

Nonaka & Konno (1998) propose Exercising *Ba* as an environment that converts explicit knowledge to tacit knowledge and supports internalization of SCT explicit knowledge through practice. Although X schools also have teaching mentors and experienced teachers supervised focused practice, Y School's knowledge leadership practices, such as peer-lesson observation, post-lesson review, and comprehensive mentoring during Learning Circle implementation, are better examples of Exercising *Ba* than those of X School. Novice teachers' internalization of SCT knowledge is continuously enhanced by using SCT PCK in real-life or simulated classroom applications.

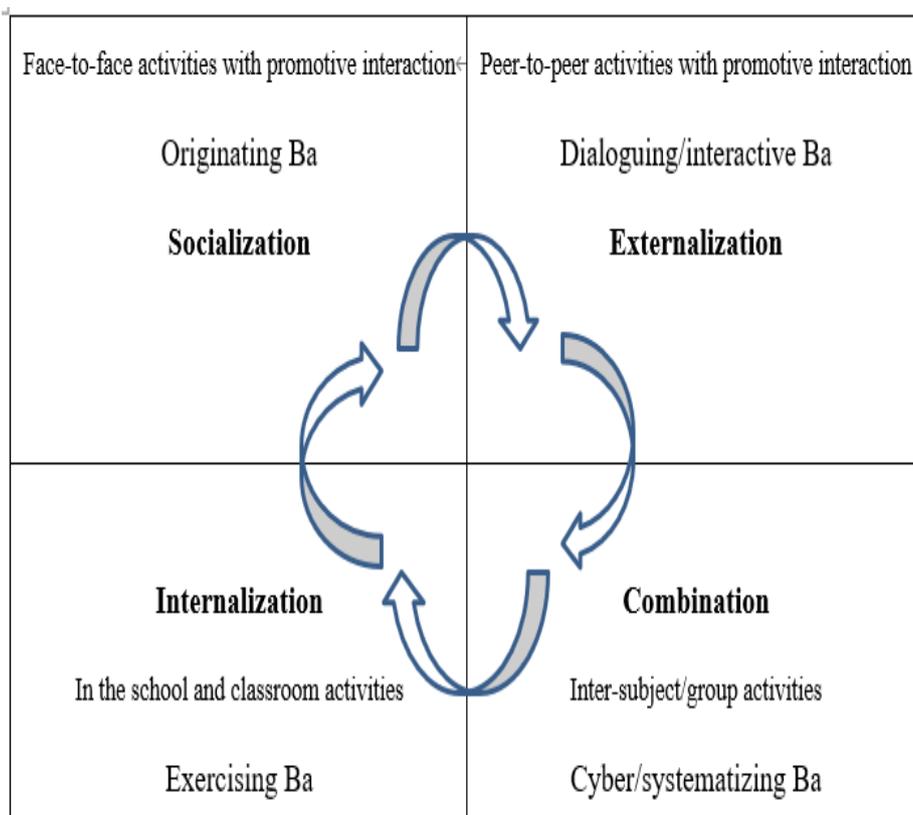


Fig. 4.6 Four characteristics of *Ba* for knowledge creation adapted form Cheng (2019a, p39).

Cheng (2019a) defined *Ba* as a knowledge-sharing culture and practices that facilitate knowledge creation. Fig. 4.6 and Table 4.7 summarizes the SECI model and the four types of *Bas* required for creating SCT PCK in Y School.

Table 4.7 Four phases of SECI model in creating SCT PCK and the required *Ba*

SECI steps and the required <i>Ba</i>	Targets and tasks
Socialization phase -- substantiated by originating <i>Ba</i> ^{e3}	Allowed SCT knowledge to be socialized through face-to-face promotive interaction, in which the teachers shared feeling, emotions, experiences and mental models in formal activities and informal gathering. During this phase, teachers discussed on potential barriers in exchanging personal tacit knowledge. This can be accomplished by informal social gatherings such as morning breakfast and coffee time in pantry, visiting and informal meetings that led to "experiential knowledge asset like common experience, skills, love and passion" (Hosseini, 2011). ^{e3}
Externalization phase-- substantiated by dialoguing/ interactive <i>Ba</i>	Allowed teachers share their personal experiences and abilities, converting them into common language and shared concepts through peer-to-peer interaction in subject-panel/ group activities. Subject panel tried to create a space where SCT tacit knowledge was transferred and externalized into SCT explicit form. This could be finished by formal meetings, collective SCT lesson planning and decision-making meetings that led to conceptual knowledge asset like SCT explicit knowledge articulated through lesson plans, report cases and SCT teaching materials.
Combination phase-- substantiated by cyber/ systematizing <i>Ba</i>	Allowed a context for the combination of new explicit knowledge with the one that already existed within the school. School provided a virtual space such as server or google drive where information technology facilitates the combination process. This could be finished by electronic communication, formal documents, database and shared KM system which led to routine knowledge asset like SCT tacit knowledge embedded in actions or know-how in daily operations such as SCT manual.
Internalization phase-- substantiated by exercising <i>Ba</i>	Allowed the SCT tacit and explicit knowledge that was socialized, externalized and systematized to be once again interpreted and internalized by the teachers' cognitive system as new SCT concepts and pedagogical practices. It was believed that during this phase the SCT explicit knowledge turned to SCT tacit knowing once again. This would lead to systematic knowledge asset like systematized and packaged experienced SCT knowledge, new SCT instructional development and pedagogical innovations.

4.3.2.4 School Knowledge Leadership's role in Cultivating *Ba* for SCT Knowledge Creation and Transfer

School leadership cultivates *Ba* for knowledge creation and transfer. Nonaka's definition of *Ba* nurtures a collaborative culture with high trust which is essential for effective Learning Circle operation in the HK context. The four *Bas* - Originating, Dialoguing, Systematizing, and Exercising - operate the four knowledge conversation processes. They articulate the relationship between individual teacher SCT

knowledge learning under distributed teacher knowledge leadership, subject-departmental SCT knowledge learning under situational knowledge leadership, and school-level SCT knowledge learning under centralized principal knowledge leadership.

The four *Bas* supported collaborative SCT Learning Circles in Y School, driven by teacher professional autonomy coupled with professional accountability, ongoing instructional improvement, and collegial trust, while driving the PDCA cycle. Y School's on-going teacher learning and collaborative culture of knowledge sharing promote personal professional knowledge mastery. Besides, trust for SCT knowledge sharing, subject-departmental group learning, shared knowledge vision, and systems thinking promoting inter-departmental SCT knowledge combination.

Teacher knowledge leaders played a distributed leadership role in socializing and internalizing SCT tacit knowledge. The mentoring system and SCT Learning Circle accelerated the socialization of SCT tacit knowledge, fostering collegial trust. This represents the transfer of SCT tacit knowledge from one teacher to another.

SCT tacit knowledge socialization was acquired through formal educational processes like SCT collaborative lesson preparation in X School and SCT Learning Circle implementation in Y School, as well as informal interaction and sharing among teachers. Collegial trust accelerates the socialization process. Teacher peer-level

gatherings and meetings in SCT Learning Circle and school mentoring programs provided originating *Ba* and facilitated socialization of SCT tacit knowledge.

Core Subject-panel Heads served as middle managers promoting professional dialogue in SCT collaborative lesson preparation in X School and SCT Learning Circle implementation in Y School. Vigorous professional dialogue sustains externalization of SCT tacit knowledge into subject and team-based SCT explicit knowledge, enhanced in Core subject-panel and Grade-level Meetings.

Interview data analysis shows that the centralized knowledge leaders of Y School emphasizes teacher collaboration in the SCT Learning Circle implementation process, developing professional communities through enriched teacher collaboration. Strong collaboration at subject-departmental meetings promoted team-based SCT teacher learning and collective reflection on SCT classroom practice, enabling the collective learning process to create SCT knowledge for effective SCT policy implementation at the school level.

Teachers improved student learning through SCT pedagogical practice developed through continuous professional dialogue in subject-panel meetings. This facilitated externalization of SCT tacit knowledge into explicit knowledge documented in core subject-panel development plans.

Subject-departmental meetings in the SCT Learning Circle facilitated dialoguing

Ba and externalization of SCT tacit knowledge into explicit knowledge through professional dialogue.

Y1, Y2, Y3, Y4, and Y5 play a centralized knowledge leadership role in school-level SCT knowledge creation. They encouraged a collaborative working culture, growth mindset, and a shared knowledge vision, paving the way for combining SCT explicit knowledge, enhancing student learning, and school promotion resulting in better P1 intakes.

Cheng (2019a) emphasized the importance of system thinking for school leadership and teachers to integrate new explicit knowledge with existing information, enabling dissemination throughout the school. Systematizing *Ba* through school-level SCT Learning Circle, a shared vision, and systems thinking facilitates the process of combining SCT explicit knowledge in Y School.

The “PDCA” cycles of the Learning Circle provide a safe environment for teachers to exercise SCT professional practice and internalize explicit knowledge as personal tacit knowledge. Y1 implements SCT Learning Circle in the school’s development plan and emphasize the culture of continuous improvement. Y1 shares the school’s knowledge vision during the SCT Learning Circle and related sessions, emphasizing the need to improve teaching to enhance student learning. In Y School, some teachers shared why they tried hard to expand their SCT pedagogical capacity

through individual practice:

“The school invests in training subject-heads and novice teachers, supporting overall development. Teachers’ professional growth and ability to facilitate effective learning for students contribute to the school’s knowledge vision.

The school is dynamic, and its teachers are full of vitality.”

(Y10)

In Y School, teachers applied SCT techniques in the classroom context using Galton’s six SCT principles through individual SCT practices within the Learning Circle implementation process. The Learning Circle provided the exercising *Ba*, offering a safe environment for teachers to develop personal mastery and internalize SCT tacit knowledge.

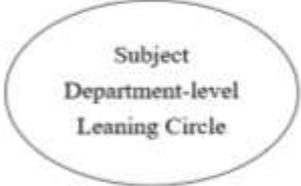
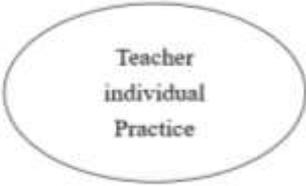
Socialization ²	Externalization ²
	
Collegial Trust	Professional Dialogue
Internalization	Combination
	
Personal Mastery	Shared Vision and Systems Thinking

Fig. 4.7 The four *Bas* for enhancing the SCT knowledge creation process in Learning Circle adapted from Cheng (2019a, p.64)

Y School nurtured the four *Bas* for enhancing SCT knowledge creation process in SCT Learning Circle through its collaborative learning culture (See Fig. 4.7).

“The SCT Learning Circle promoted collegial lesson observation and nurtured a culture of lesson observation and exchange.”

(2018-19 School Annual Report of Y School, (p.29))

4.3.2.5 School Knowledge Vision for operating SECI Mechanism by Articulating Knowledge Vision and Achievement Goals

Centralized principal leadership was crucial in establishing a shared knowledge vision and setting the school’s direction. According to Nonaka & Toyama (2005), a school’s knowledge vision stems from answering the fundamental question of “Why do we exist?” For knowledge-creating schools, a more critical question is “Why do our schools differ?” as the knowledge vision provides a clear direction for knowledge creation.

The school’s knowledge vision included a value system to assess and validate knowledge created. Noted that Y School’s knowledge leadership can influence the knowledge creation process by articulating the school’s knowledge vision, promoting sharing of knowledge assets, and enhancing the spiral cycle of knowledge creation as suggested by Nonaka & Toyama (2005).

Y School involved various stakeholders in developing their well-framed vision

statements, owned and articulated by teachers, which aligns with the insight provided by Awamleh & Gardner (1999). The knowledge vision in Y School was initiated, developed, and shared by all teachers to help students achieve their fullest potential through effective learning, reflecting the school's purpose and values, according to Y1.

Y1 involved various stakeholders in a vision-building workshop to refine the school's mission statement. Teachers directly participated, while parents and students joined focus group meetings to develop a specific and concrete vision, which is consistent with Hamel & Prahalad's (1989) argument that a clear and well-understood vision is crucial for a school's sustainable competitive advantage. The school community collaboratively created a new vision: "a happy and caring school that invites students to strive for powerful learning so as to achieve their fullest potential".

X1 and Y1 note that their school's vision and mission statements are predetermined by the sponsoring body, leaving little room for modification. Despite a "top-down" approach, Y1 found ways to implement tailored SCT policies within the given framework.

Y1 made a significant effort to develop and share the school's knowledge vision with stakeholders, fostering a sense of purpose among members. The vision is to create a happy and learning school to optimize student learning with teamwork

among teachers through SCT Learning Circle and KM initiatives, creating PCK and teaching strategies in SCT.

Teachers and middle managers agreed that Y1 successfully created a vision where members have a sense of purpose and established a caring school culture. This led to centralized leaders, middle managers, and teachers showing care, concern, and appreciation for each other, creating a sense of team and feeling understood and appreciated.

Middle managers and teachers in Y School agree that Y1's leadership practices focus on moral purpose, love and care, role modeling, and humbleness, which are central to achieving school goals through mutual understanding and a shared vision.

“SCT aims to enable teachers to customize learning based on each child's tendencies and abilities, taking better care of them.”

(Y1)

Middle managers and teachers at Y School valued Y1's conscience in helping underprivileged students from low SES and single-parent families, as the school provided most of their learning opportunities. Y1's advocacy of “moral purpose” resonates with teachers, agreeing that SCT could help underprivileged students by making optimal use of smaller class sizes and improving basic education quality as suggested by Galton et al. (2019). In Y School, moral authority makes formal

authority work which aligns with Covey (2005) who states that conscience and moral authority are crucial in leadership.

Y School aims to nurture students' development through a quality-enriched and dynamic learning environment, adopting SCT and cooperative learning approaches to help students reach their full potential which aligns with Chan's (2012) research that SCT can be used to enlighten students' full potential.

In X School, there was a lack of common understanding of shared goals among the principal, middle managers, and teachers, as they emphasized different priorities and directions for school development. The principal prioritized school promotion to increase P1 intakes, while some middle managers and teachers desired more two-way communication and less administrative workload not directly related to teaching duties, feeling the pace was too fast.

4.3.3 The knowledge leadership practices of school leaders on KM for SCT

implementation

4.3.3.1 The Leadership Practices and Organizational factors that enable the individual teachers to share their SCT tacit knowledge through Socialization

Socializing SCT knowledge in school involves acquiring, gathering, and constructing knowledge in a social context. Cheng (2019a) suggests that sharing tacit knowledge occurs through interactions with natural environments and experiencing a

common time and space with others.

Y School overcame the barrier of a lack of time to share SCT knowledge by arranging collaborative planning time in the SCT Learning Circle. This provided a structured opportunity for teachers to share their SCT knowledge and collaborate on improving their SCT teaching, while identifying colleagues in need of specific SCT knowledge.

“Sharing SCT knowledge in Learning Circle has become a natural part of achieving the shared knowledge vision, resulting in a culture of knowledge sharing. The school has arranged collaborative lesson preparation time for this purpose.”

(Y10)

X1 created a casual atmosphere and shared space for teachers to exchange SCT tacit knowledge related to their classroom practices by purchasing a coffee machine and placing it in the pantry. Transforming the pantry into an informal coffee room provided opportunities for sharing SCT knowledge.

Y8 observed that Y1 had successfully built a culture of sharing among teachers, with those who eagerly shared their SCT knowledge appreciated and praised by the principal in public school events.

“As the current principal has already encouraged and established this

culture of mutual trust and open classroom lesson sharing since she was serving as PSMCD. When the subject-panel shared their SCT knowledge, the principal openly praised colleagues, making them feel valued.”

(Y8)

Y School puts deliberate effort into designing a comprehensive Novice Teacher Induction and Mentoring program, which serves as an effective means to facilitate SCT knowledge socialization. This aligns with Cheng’s (2023a) insight that coaching is a process of knowledge socialization.

“Novice teachers benefit from mentorship programs with senior teachers, appreciated by the current Subject-panel Head. Teaching mentors observe novice teachers during lesson observations, followed by professional discussions that increase their SCT knowledge. Professional sharing and dialogues help novice teachers absorb SCT tacit knowledge through socialization, reducing teaching pressure during observations.”

(Y3)

Knowledge hiding negatively impact SCT tacit knowledge sharing among teachers at X School, which was avoided at Y School by making a high commitment to knowledge-sharing efforts. Y1, Y4, and Y5 established Chinese, English, and Math. SCT Learning Circles led by respective subject-panels and vice-panels.

Y1 makes knowledge-sharing practices a regular topic in performance review meetings to encourage active engagement in creating and transferring knowledge. Y5 participates in SCT Learning Circles, recognizing individual contributions and establishing teachers' ownership. Y4 clarifies teachers' roles, emphasizing the importance of contributions to the team, subject-panel, and school in supporting both novice and experienced teachers in SCT Learning Circle.

Knowledge leadership practices promote knowledge sharing and reduced knowledge hiding at Y School, making the socialization process of sharing SCT tacit knowledge among colleagues more successful than at X School.

Mentoring was an effective socialization tactic for novice teachers, enhancing their understanding of professional teaching skills and personal growth in their roles and identities as teachers through teacher learning and practical skill training.

“Experienced teachers share SCT tacit knowledge with novice teachers in a collaborative and safe working environment to familiarize them with SCT in classes. A teaching mentor program can quickly pass on accumulated SCT tacit knowledge and experience to novice teachers, helping them acquire SCT knowledge and transfer classroom-related skills.”

(Y2)

Novice teachers in both X and Y Schools learn SCT PCK from experienced

mentors through the school's mentoring system. Y School's novice teachers appreciate the situated learning offered by their mentors through authentic sharing with open classroom, gradually aligning their teaching philosophies, educational beliefs, working attitude, and instructional behaviors with the school's knowledge vision, which aligns with Cheng's (2019a) research finding that novice teachers accept the situated learning and empathize with their mentors' experience.

Y10, Y11, Y12 and Y13 learn SCT tacit knowledge best through mentors' role modeling in actual situations, such as participation, practice, simulation, and participated observation. This confirms the importance of mentoring systems in socializing novice teachers into SCT teaching, as found by Tan (2015).

Novice teachers (Y10, Y11, Y12 and Y13) in Y School appreciate their teaching mentors, Panel Heads, and Vice-panel Heads, accelerating their learning through joint problem-solving in lesson design, implementation, and review tasks which is consistent with Levinson's (2010) suggestion that joint problem-solving by experts and novices are a sound approach for capturing tacit knowledge.

Y School's SCT Learning Circle required a team of teachers to gather for mutual learning, planning, and reviewing of SCT lesson designs to promote students' learning. This socialization process shared and co-constructed SCT tacit knowledge through interaction, as noted by Marra (2004). Teachers at Y School form a network,

working cooperatively to solve SCT instructional problems and create new PCK through Learning Circle implementation. Novice teachers in Y School's Learning Circle learn by sharing teaching ideas and collaboratively developing new insights with experienced teachers and mentors, creating new SCT PCK through knowledge socialization and eventually achieve knowledge internalization. The findings of this study align with the research findings of Dudley (2013) and Liu (2019).

“During Learning Circle lesson preparation meetings, we can share SCT tacit knowledge in small group and engage in professional discussions on how to teach a particular topic. We then take turns trying out the teaching plan in each class. We continuously strive to improve SCT tacit knowledge through cyclic classroom teaching, collegial-lesson observation, and post-lesson review meetings. The cyclical learning cycle of the Learning Circle is inspiring, as it provides space for better understanding SCT knowledge through classroom practice. The implementation and enhanced understanding of SCT rely on the learning cycle, professional dialogue, and interactive discussions to sharpen my instructional ideas and stimulate reflection on lesson implementation.”

(Y11)

They value the safe and secure environment to discuss personal beliefs,

experiences, know-how, insights, and skills, learning more tacit knowledge from experienced teachers and mentors.

“With mutual trust and respect, we are eager to exchange our tacit knowledge on teaching experience and ideas and give attention to common difficulties that happen in our classroom. We will ask, listen to, discuss with, acquire knowledge from, and carefully study each other’s practical experience to tackle our common concerns.”

(Y13)

Positive interaction, professional dialogues, collegial discussion, and peer review among novice and experienced teachers are essential for sharing SCT tacit knowledge and creating SCT PCK, as noted by Nonaka & Takeuchi (1995). Accumulation of new SCT instructional ideas and exposure to SCT tacit knowledge facilitates the consolidation of SCT PCK and externalization of tacit knowledge into a documented SCT teaching manual, as seen in X and Y Schools.

Learning Circle meetings are a vital socialization process where tacit knowledge is co-constructed through discussion and collaboration as suggested by Nicolini et al. (2003). Y School’s Learning Circle follows this process, with a team member implementing the SCT lesson first and all members observing for later analysis in the post-lesson review meeting. Teachers reflect on the lesson’s

effectiveness in terms of student learning and focus on improving the design to enhance learning.

After the first post-lesson review meeting, team members consider suggestions and modify the SCT lesson plan. Another teacher implements the modified plan in their class, and the process of observation, review, and modification continues until all team members have taught the SCT lesson in their classes.

The study finds that SCT tacit knowledge was situated in the Learning Circle communities, acquired and shared through collaborative participation in a safe and trusted environment. Y12 credits the Learning Circle as a crucial socialization process that empowers him with learn-what, learn-who (Chatti et al., 2007) and learn-why to acquire high-quality SCT learning resources and contact the right person for necessary know-how, leading to better SCT classroom practices.

“In Learning Circle, we practice the cycle of teaching, where a teacher teaches a lesson and immediately provides feedback to improve the next lesson. The stimulating discussions help me not only learn how to use SCT knowledge but also think about why we use it through repeated professional dialogue and discussions.”

(Y12)

Teachers in the study report that collaborative lesson planning, rotating

classroom teaching with peer observation, and post-lesson review meetings in the Learning Circle are effective socialization processes where SCT tacit knowledge was shared, and then co-constructed through peer discussion and collaboration.

4.3.3.2 The Leadership Practices and Organizational factors that facilitate subject-departmental teachers to externalize their SCT tacit knowledge into subject level explicit knowledge through Externalization

The Study's findings from X and Y Schools show that SCT tacit knowledge is converted into explicit knowledge, such as documented lesson plans, learning materials, minutes, and records, through externalization using text, diagrams, and images.

Interview data analysis confirms Cheng's (2013a, 2019a) illustration that SCT tacit knowledge can be developed into PCK of core subjects at departmental and school levels in Schools.

“As for the school's major concern, we highly value the learning circle and understand that it is meant to optimize students' learning through the implementation of SCT. This school approach begins with the principal and SMT proposing and discussing, followed by the subject panels, and then it gradually spreads to all teachers, who also attach great importance to these focus areas related to SCT learning circle to

share SCT tacit knowledge and externalize it into PCK at departmental and school levels.”

(Y9)

Y11 (See p.291) shares how professional dialogue sharpened her instructional ideas and transformed her SCT tacit knowledge into clear and focused documented lesson plans. Open participation in SCT lesson design, implementation, and review, as well as professional dialogue and discussion, triggered the externalization process.

The study finds that Y School’s teachers use the Learning Circle to externalize SCT tacit knowledge through professional dialogue, interactive discussion, team confrontations, and group collaboration, resulting in the creation and documentation of SCT explicit knowledge. Teachers attribute the dynamic reflection-on-action process to the creation of crystallized SCT explicit knowledge.

“Collaborative lesson planning records from the Learning Circle show that each subject has developed at least one teaching case design in the second semester, including lesson plans, teaching PPTs, teaching reflections, and other teaching resources.”

(2020-21Annual Report of Y School, (p. 10))

SCT knowledge externalization occurs in Y School’s post-lesson review meetings and departmental sharing sessions after completing all instructional cycles

of the Learning Circle which aligns with Cheng's (2023a) research finding that post-lesson conferencing is a knowledge externalization process. Teachers suggest improvements and modify the SCT lesson plan for future use, and Panel Heads as middle managers knowledge leaders encouraged teachers to share their SCT knowledge across departments, turning personal tacit knowledge into departmental explicit knowledge. Nonaka & Takeuchi (1995) suggests that this process codifies SCT tacit knowledge into explicit knowledge through departmental documents and SCT lesson plans. The study finds that teachers who participate in the Learning Circle that use Galton's six SCT principles as a guiding principle for instructional design, making it easier for them to externalize, reflect and review their SCT teaching.

4.3.3.3 The Leadership Practices and Organizational factors that facilitate the combination of group-specific SCT knowledge into school SCT knowledge through Combination

The combination of SCT explicit knowledge facilitates teachers to design and organize SCT learning activities tailored to address student learning difficulties and cater to learning diversity in the classroom context, operating as an explicit-to-explicit converting mode at the school level. The cross-disciplinary collaboration effort such as sharing in Y School facilitates the SCT knowledge combination process which aligns with the insight provided by Cheng (2023a) that across-subject sharing

is a knowledge combination process.

“Through cross-disciplinary collaboration, we combine SCT knowledge from different departments to become the IC of our school. We tailor cross-disciplinary courses and design SCT teaching strategies to meet students’ learning needs and diversity, enhancing their learning effectiveness and achieving our shared knowledge vision.”

(Y6)

“According to the questionnaire, all teachers who participated in Learning Circle agree that the meetings can help them examine the appropriateness of learning activities and assignments and develop teaching resources to cater to the needs of students with learning diversity.”

(2019-20 Annual Report of Y School, (p. 10))

The combination of SCT knowledge operate at three levels: individual teacher, subject-department and school level. At the individual level, teachers combine their present conceptual understanding with past experiences. Subject teachers collaborate in lesson preparation meetings to choose topics, define learning difficulties, and plan SCT lessons.

At the subject-department level, collaborative lesson planning combines teachers’ conceptual understanding with how others dealt with subject knowledge.

Combining SCT explicit knowledge help teachers design effective SCT learning activities to tackle student difficulties and enhance learning.

At the school level, Y School convert SCT explicit departmental knowledge on promoting reading in Chinese Language into Reading across the Curriculum as usable explicit school knowledge. They merge explicit reading knowledge with other subjects and process it to form more systematic explicit school reading knowledge.

“Reading across the Curriculum involves collaboration between English, Chinese, General Studies, Civic Education, and the library study to address student learning needs. Library sessions are used for student consolidation and summarization of learning outcomes. The program has been successful.”

(Y7)

“The Subject-panel Heads lead subject teachers to review the school-based curriculum in the Learning Circle/preparation meeting, integrate similar content, and carry out interdisciplinary cooperation to enhance students’ comprehensive application ability.”

(2021-22Annual Report of Y School, (p. 12))

Nonaka et al. (2000a) suggest that SCT knowledge combination occurs when different subject-panels co-create and elicit school-level SCT knowledge. X School’s

core subject-panel heads and middle managers admit that the process was difficult due to a lack of open and knowledge sharing culture among subject-panels to facilitate communication and knowledge sharing.

Cheng (2019a) argues that a shared school vision is necessary for successful SCT knowledge combination. Y School is more successful due to a strong, shared knowledge vision owned by all teachers, achieving sustainable competitive advantages through knowledge creation at the school level. Y School has a clear vision for knowledge development, focusing on teachers' purpose in cultivating students' problem-solving and lifelong learning abilities using SCT.

The school's core subject-panels engage in ongoing creation and sharing of PCK through Learning Circle at the departmental level. This knowledge is further disseminated through professional sharing sessions and professional development activities across subjects, fostering cross-subject collaboration. The school consolidates the knowledge gained from Learning Circle during school events and documents it in SCT teaching manuals and reports for widespread application and dissemination within the school, generating new SCT school knowledge assets.

4.3.3.4 The Leadership Practices and Organizational factors that enable individual teachers to internalize the SCT explicit knowledge into their tacit knowledge through Internalization

Internalization at the individual teacher level was the explicit-to-tacit converting mode. Y School's successful internalization process involved teachers understanding and absorbing SCT explicit knowledge using Galton's six SCT principles, turning it into personal tacit knowledge through individual SCT classroom practice. Below is the example of Y13:

“We didn't deliberately mention the six SCT principles we used in class, because we have been internalized, just like breathing, so natural that they can be unconsciously applied in classroom practice. Because, the SCT lesson implementation and lesson observation accelerated the internalization process.”

(Y13)

Both Y2 and Y3 agree that Y School's teachers design, try out, review, and share their own SCT lesson plans and materials during Learning Circle implementation, creating SCT knowledge. Farnese et al. (2019) describe the SECI knowledge creation spiral, which concludes with internalization, where Y School's teachers absorb SCT knowledge, enriching their tacit knowledge. The formal SCT knowledge is connected to personal experiences and used in practical classroom situations, creating new SCT knowledge internalized into teachers' tacit repositories for renewed SCT routines.

“Regarding measures to encourage novice teachers to internalize SCT knowledge, the school promotes collegial lesson observation through Learning Circles. By observing and imitating colleagues’ good classroom practices, novice teachers can adopt and adapt these SCT practices into their own lesson implementation.”

(Y2)

“The Learning Circle has successfully help teachers to internalize the Galton’s six SCT principles into their daily teaching. Through repeated use, our teachers can internalize the SCT explicit knowledge into their own tacit knowledge through internalization.”

(Y3)

Y School and X School provide mentorship programs for novice teachers, using SCT documents, simulation, and trial-and-error sessions to help them integrate and enhance their SCT knowledge, creating new tacit knowledge. The role of panel heads, vice-panel heads and form-coordinators to serve as teaching mentor are vital for facilitating the knowledge internalization process of novice teachers.

“Regarding teaching material digital achieves, all department already has

some well-designed texts or soft copies. Under the encouragement of the panel heads as teaching mentors, our new teachers are used to modify the teaching materials in their own lesson implementation and optimize their classrooms based on their own characteristics. This process internalizes the explicit knowledge of past teachers and transforms them into their own SCT tacit knowledge.”

(Y8)

Interview, lesson observation and documentary review data analysis shows that the internalized SCT knowledge of Y School’s novice teachers became personal mastery of SCT knowledge, leading to the creation of new knowledge.

“Internalizing and incorporating explicit knowledge into personal professional knowledge improves one’s professional level and contributes to the knowledge-sharing and creation culture of the school. This can help establish a teaching mechanism that continuously improves the school’s teaching level in future SCT Learning Circle.”

(Y10)

According to Keese et al. (2023), comprehensive mentoring programs are teacher support structures that offer multiple components, such as mentorship, professional development, observation and feedback cycles, and reduced teaching

loads. Y School's Newly Appointed Teacher Mentorship program, combines with Learning Circles, is more effective in internalizing SCT knowledge into personal tacit knowledge than X School's mentoring system. Y School's program, as described by Keese et al. (2023), is comprehensive and continuous, providing mentorship, professional development, observation, and feedback to support novice teachers in internalizing SCT knowledge into personal tacit knowledge.

In contrast, X School's mentoring system for novice teachers lacks the comprehensive and continuous nature of Y School's program. It only provides mentorship and feedback on teaching without including lesson practices with collegial observation. This may not be sufficient to support the internalization of SCT knowledge into personal tacit knowledge.

At Y School, teachers obtain SCT knowledge through socialization, externalization, and combination processes, successfully internalizing them as individual tacit knowledge through observed lesson implementation. This conscious and subjective process allowed teachers to validate SCT knowledge and turn it into new tacit knowledge for future instructional practices. Internalization of SCT explicit knowledge involves subjective and conscious learning, becoming new tacit knowledge validated by the teacher when combined with classroom situations.

Internalizing SCT explicit knowledge is crucial for the creation of knowledge,

as it involves the transformation of formal SCT knowledge into personal tacit knowledge, thus initiating another cycle of knowledge creation. Y School's success highlights the importance of comprehensive mentoring programs and distributed teacher knowledge leadership in supporting the ongoing conversion process of SCT knowledge socialization and internalization.

At Y School's Learning Circle, teachers collaborate in lesson preparation, teach SCT lessons, and observe each other's teaching. By applying Galton's six SCT principles and enacting lesson plans, teachers comprehend and internalize SCT knowledge through lesson implementation which aligns with Cheng's (2023a) research finding that lesson implementation is a process of knowledge internalization. Learning by doing and classroom simulation help teachers accumulate and internalize SCT tacit knowledge. Y School's practices of implementing post-lesson review can effectively facilitate the novice teachers's knowledge internalization process.

“After the trial of our jointly developed lesson plans, we hold a post-lesson review meeting to discuss any deficiencies in teaching and brainstorm ways to improve before the next class. Through this interactive process of professional dialogue and lesson implementations, we create, practice, and internalize SCT knowledge together.”

(Y11)

In X School, the collaborative lesson preparation scheme lacks peer observation of SCT lessons, which is critical for transferring tacit knowledge and learning by doing. Interview data analysis reveals that enacting SCT lesson design was essential for converting explicit knowledge into individual tacit knowledge. At Y School, teachers apply shared knowledge in their classrooms by enacting SCT lesson plans, internalizing it as personal knowledge as suggested by Kolb (1984).

The study investigates the performance discrepancy between Y School and X School in developing SCT PCK. Y School's Learning Circle offered a more comprehensive platform with collaborative lesson design, lesson implementation, peer observation, and post-lesson review, promoting teacher collaboration, professional learning communities, and knowledge creation. In contrast, X School teachers use collaborative lesson preparation to design SCT lesson plans and materials without peer observation or post-lesson review arrangements, except for the recently introduced USIP program, which is not primarily for SCT implementation.

Y School's comprehensive platform, including the Learning Circle, facilitates teacher collaboration, professional learning communities, and dynamic knowledge creation process, resulting in better performance in creating SCT PCK. The absence of corresponding arrangements at X School may have contributed to their lower performance.

Y School's Learning Circle and mentoring program are credited with achieving better success in internalizing explicit SCT knowledge into individual tacit knowledge during SCT knowledge creation process. This study suggests that KM should be framed from a school management perspective, which is useful for sustainable development. The SECI model works well in schools, as knowledge creation is crucial for the development and management of schools in HK.

4.3.4 The Organizational Factors that put forward KM and school knowledge creation and transfer for SCT implementation

The study's findings can be applied to improve SCT knowledge sharing and creation in HK primary schools by enhancing organizational factors such as:

4.3.4.1 School Cultural Factor of Collaborative Working: Encouraging collegial collaboration, communication, and knowledge sharing among teachers through the implementation of Learning Circle

SCT Learning Circle offer a structured approach to knowledge creation and transfer where teachers regularly engage in SCT knowledge sharing, professional discussions, share resources, and provide feedback. This builds a culture of collegial collaboration and support that enhances SCT teaching and learning quality in the school.

"I believe that Learning Circle can help foster a collaborative culture of

knowledge sharing, which is a critical success factor in socializing and internalizing SCT tacit knowledge.”

(Y6)

Informal knowledge sharing can be promoted through regular opportunities for teachers to interact during coffee breaks, lunchtime discussions, and social events.

4.3.4.2 School Professional Development Factor of Teacher Development, Appraisal, and Assessment Mechanism of Teacher in SCT: Providing Opportunities for Professional Reflection and Continuous Teacher Learning

Improving SCT practices requires professional reflection and continuous teacher learning within Learning Circles. The SECI mechanism highlights the importance of socialization and internalization in knowledge creation, so schools should provide safe and trusting environments for reflection. This can be achieved through professional development programs, collegial observation, and feedback mechanisms. Professional reflection and continuous teacher learning in Learning Circle help teachers identify areas for improvement and gain insights and ideas for enhancement through self-reflection and sharing experiences with peers.

Based on Y School’s experience, the use of SCT lesson observation and appraisal form serves as an effective feedback mechanism. The form provide input from the principal, middle managers, mentors, or peers, promoting SCT learning and

reflection among teachers. This process helps identify areas for improvement and enables necessary adjustments. Teacher reflection and learning in Learning Circle enhance SCT practices, improve student learning outcomes, and cultivate a culture of continuous instructional improvement within the school community.

4.3.4.3 School Contextual Factor of High Collegial Trust: Creating a Supportive Organizational Culture

Establishing a supportive school culture is crucial for SCT knowledge sharing and creation, as emphasized by the SECI mechanism. Knowledge leaders must create a culture of mutual trust that values innovation, experimentation, and rewards teachers for sharing expertise. A supportive school culture that values SCT knowledge sharing benefits schools and teachers by encouraging experimentation with new SCT teaching strategies and innovative approaches. This leads to improved student learning outcomes and a more engaging classroom environment.

Rewarding teachers for sharing SCT knowledge and expertise promotes collaboration and teamwork, leading to more effective SCT classroom practices and development of new teaching ideas. A supportive school culture with high mutual trust boosts teacher morale and job satisfaction, motivating and engaging teachers in their work.

4.3.4.4 School Infrastructural Factor: Using ICT and Organizational design should

be heterarchy instead of hierarchy so as to facilitate knowledge sharing and creation

ICT benefits schools and teachers by providing open access to SCT resources and information, improving SCT teaching strategies and student learning outcomes. Using ICT can be a valuable tool for schools to promote knowledge sharing and creation, encouraging collaboration, innovation, and continuous learning in SCT teaching practices.

Schools with hierarchical structures and top-down decision-making processes hinder knowledge sharing and creation as teachers may feel less empowered to share their SCT knowledge and ideas. Decentralized and participative school designs encourage open communication, facilitate knowledge sharing and creation as teachers feel more empowered to contribute their ideas and knowledge.

4.3.4.5 School Vision and Mission Factor: The power of Knowledge Vision

Centralized knowledge leadership with shared knowledge vision can shape school's culture and practices. The school's knowledge vision can impact knowledge sharing, creation, and transfer in several ways, especially in SCT.

Y School prioritizes SCT knowledge in its vision, which encourages teachers to participate in professional development programs and collaborate to share good SCT practices. This shared knowledge vision motivates teachers to engage in SCT

knowledge creation and transfer, creating a culture of teacher learning and continuous improvement that values knowledge sharing. As a result, teachers are more willing to share their expertise and learn from others. This study confirms the importance of the centralized knowledge leaders' role as a knowledge vision builder, as noted by Nonaka et al. (2000b), Chu (2016b) and Hu (2019).

4.3.4.6 School Partners' Support

School partners' support is crucial in providing resources for knowledge creation and transfer. They offer SCT professional development opportunities, fund SCT initiatives, and develop new teaching materials and innovative approaches to support SCT as suggested by Raulik et al. (2006) and Cheng & Lee (2014). Principal, as centralized knowledge leader, play a vital role in implementing KM in schools by seeking support from external partners which aligns with Hu (2019).

School partners facilitate teacher collaboration and networking, creating opportunities for SCT idea sharing through online or in-person meetings, fostering a culture of knowledge sharing, and building an SCT learning communities. Working together, schools and partners create a supportive environment for SCT and enhance student learning outcomes.

4.3.4.7 Knowledge leaders as a Role Model

In this study, knowledge leaders are identified to play a crucial role in KM by

serving as a role model and actively participating in KM activities as suggested by the literature (Viitala ,2004; Van Winkelen, 2006; Lakshman, 2007). The three-tiered knowledge leaders influence teachers' SCT behavioral patterns and promote the creation and transfer of SCT knowledge which aligns with the findings of Bandura (1977), Shamim et al. (2019) and Xia et al. (2019).

In Y School, teachers perceive knowledge leaders as a role model, particularly in knowledge sharing and application, as suggested by Bertoldi et al. (2018) and Shariq et al. (2019). The centralized knowledge leaders in Y School value SCT knowledge, inspiring intellectual growth, fostering a continuous learning culture, and guiding teachers in effective KM, which is consistent with Viitala (2004) and Donate & de Pablo (2015).

The findings of this study are also consistent with Bandura's social learning theory, highlighting the influential role of knowledge leaders as role models in shaping organizational behavior, as suggested by Gürlek & Çemberci (2020).

4. 4 Three-tiered Knowledge Leadership

Based on the above findings, the following is the empirical model on the three-tiered knowledge leadership practices for KM implementation which explains the relationship between knowledge leadership practices, KM, and effective SCT implementation (See Fig. 4.8).

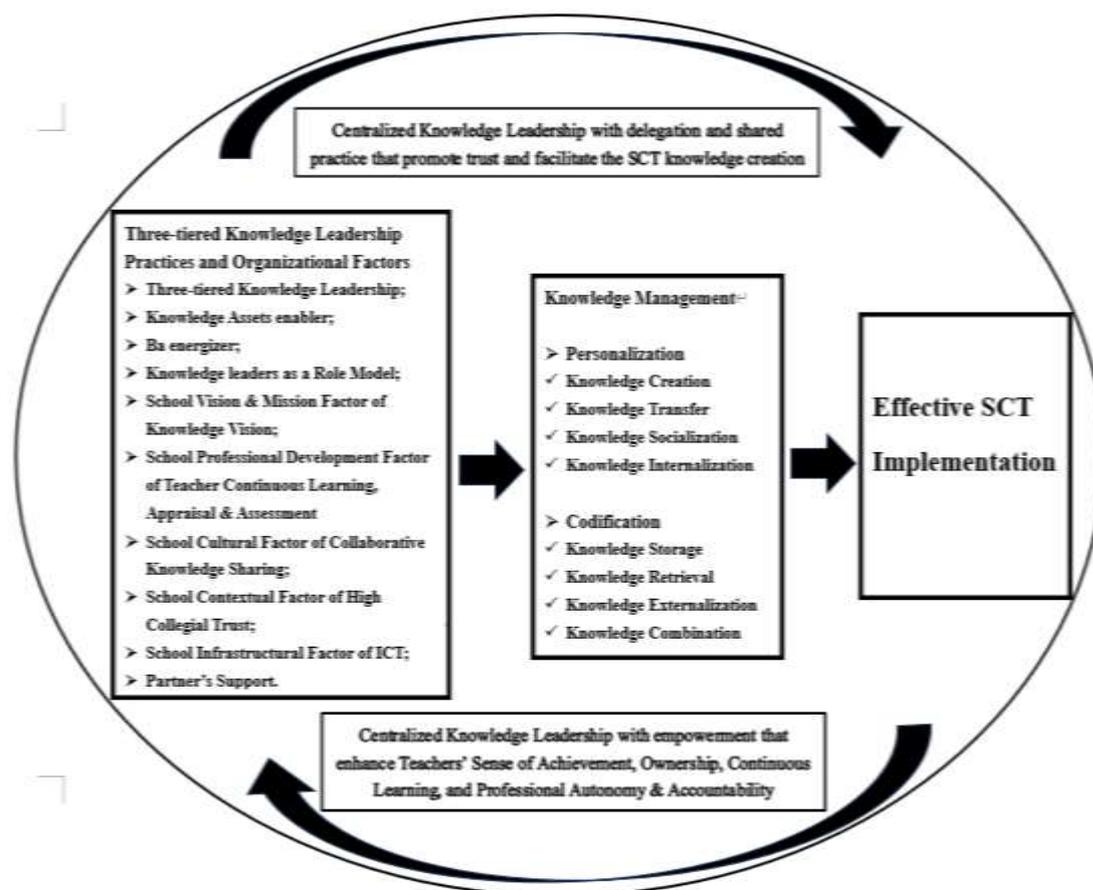


Fig. 4.8 An Empirical Model on the Three-tiered Knowledge Leadership Practices for School KM Implementation and the Relationship between Knowledge Leadership Practices, KM, and Effective SCT Implementation

The discrepancy in SCT implementation between School X and School Y, as discussed in sections 4.1 and 4.2, can be attributed to the implementation of KM practices. Specifically, the exercise of personalization and codification KM strategies, plays a crucial role in converting both tacit and explicit SCT knowledge. These KM strategies are initially formulated by KM leaders who actively engage in KM practices. In a school setting, knowledge leadership skills are regarded as the capacity of principals, middle managers, and teachers to utilize their leadership skills, knowledge expertise and understanding of school administration, curriculum, subject

matter, and instructional practices to positively influence teacher learning for student learning.

The findings of this study show that three-tiered knowledge leadership is carried out by centralized leaders (Principal, Vice-principals, and PSMCD), situational leaders (middle managers), and distributed leaders (teachers). These leaders provide conducive conditions that enable KM initiatives and facilitate SECI knowledge creation process, promoting the effective SCT implementation. The study shows that school leaders can make use of KM to create school's competitive advantage and to improve school's education quality by facilitating effective SCT implementation. The illustration below, provided by Y4, depicts teachers as distributed knowledge leaders. The centralized leaders at Y School share a common goal of developing teachers as distributed knowledge leaders.

“The principal, vice-principals, and PSMCD share a common goal: empowering colleagues to become distributed teacher leaders.”

(Y4)

The elaboration below, provided by Y4, focuses on the role of middle managers as knowledge leaders. The middle managers are delegated and empowered by the centralized knowledge leaders to serve as situational knowledge leaders, playing a crucial role in facilitating SCT knowledge creation at Y School. Additionally, middle

managers also act as mediators between management and front-line teachers.

“Middle managers are managing pedagogy and curriculum at the subject or cross-disciplinary level, and facilitating communication between teachers and management for knowledge externalization and future combination. They play critical roles as change agents and context providers for SCT knowledge creation, as well as facilitators of SCT knowledge creation at the subject level. The principal, vice-principals, and PSMCD, work together to establish the vision and determine the SCT policy direction.”

(Y4)

The Vice-principals (Y2, Y4), PSMCD (Y5), and a Subject-panel Head (Y6) of Y School attribute the “system thinking” purposely cultivated by Y1, which enables the three-tiered knowledge leadership to operate and coordinate the SECI SCT knowledge creation and transfer process. In this sense, Y1 embodies a centralized knowledge leader who incorporates both transformational and transactional leadership traits into her own knowledge leadership style.

“Without the “system thinking” and shared vision deliberately articulated by the principal, the entire SCT knowledge creation process would not be as successful in our school. Her leadership is essential”

(Y5)

In addition to the leadership practices of the three-tiered knowledge leaders, organizational factors are also important for enabling the smooth operation of KM in the school (See 4.3.4 and Fig. 4.8).

4.4.1 Centralized Knowledge Leadership role

The principal, along with the vice-principals and PSMCD as part of the SMT, plays an essential role in knowledge leadership by enabling conducive conditions for KM. It is the centralized knowledge leaders who have initiated and adopted the Learning Circle as an important KM measure in Y School.

“We use the Learning Circle as a KM measure to acquire, share, create, and apply school knowledge resources to promote lesson preparation and improve teaching effectiveness. Promoting SCT through KM is an important task of our school knowledge leadership.”

(Y2)

Besides, they also play a crucial role in providing support and resources, fostering a culture of continuous improvement and innovation, and promoting ownership and shared accountability among all stakeholders in the school community. They serve as the centralized knowledge leader, setting the knowledge vision and direction and ensuring SCT policies and practices align with the shared knowledge

vision.

Centralized knowledge leaders also play a crucial role in supporting SCT implementation by providing professional development opportunities, technology, materials, and equipment. They create a culture of continuous improvement and SCT knowledge sharing, and recognizing and rewarding SCT excellence in a high collegial trust environment.

At Y School, the principal plays a vital role in fostering a shared sense of purpose and accountability among stakeholders. The centralized knowledge leaders initiate a role modeling effect and ensure the sustainability of KM and SCT implementation by encouraging open communication, initiating knowledge audits, and promoting Learning Circle. The principal's leadership style influences teacher communication networks, allowing for increased participation and reflection, as suggested by Law et al. (2014).

4.4.2 Middle Managers as Situational Knowledge Leaders with mediating role

Middle managers, such as the Prefect of Studies, Subject-panel Heads, Vice-panel Heads, and Form Coordinators, operate under the coordination of PSMCD. They serve as change agent, SCT knowledge facilitators, and act as teaching mentors for novice teachers. Additionally, they also function as situational knowledge leaders, managing the curriculum at the subject or cross-disciplinary level and facilitating

communication between teachers and management. These middle managers play critical roles as change agents and SECI knowledge creation context providers, as well as facilitators of SCT knowledge creation at the subject level.

As a centralized knowledge leader, Y4 believed that middle managers as situational knowledge leaders and the power of shared knowledge vision are the effective mediating factors between centralized knowledge leadership and distributed knowledge leadership.

“The wonderful thing is that the SCT Learning Circle initiative was advocated by the principal at the beginning. However, after the Learning Circle was launched with situated middle managers as vital change agents, the driving force came from the teachers’ active participation and involvement. I believe this is because it stems from a genuine concern for effective learning for our students and a true belief in our school’s knowledge vision. This is not just the result of top-down leadership from the school, but also the teachers’ bottom-up voluntary participation.”

(Y4)

Middle managers play a critical role as situational knowledge leaders and serve an important function as teaching mentors, enhancing the process of socializing SCT tacit knowledge.

“The implementation of Learning Circle enables middle managers to demonstrate their role as knowledge leaders. With the support and encouragement of the principal, it enables us to apply what we have learned in the SCT classroom to our practical teaching and mentor novice teachers through the Mentorship program. Learning Circle helps us transfer what we have learned from other teachers to assist novice teachers in their learning. The knowledge leadership of middle managers contributes significantly to improving the effective SCT implementation.”

(Y6)

Middle managers play a crucial role in successful SCT implementation by validating SCT knowledge, providing support, guidance, and resources, serving as role models, promote evidence-based practices among SCT teachers. They bridge the gap between the principal’s knowledge vision and teachers’ classroom practice by translating it into actionable plans and strategies. Middle managers play a critical role in ensuring effective SCT implementation by supporting teachers in the classroom.

“Experienced middle managers validate SCT practices, identify valuable SCT knowledge for learning and emulation, and provide clear professional development direction, boosting colleagues’ sense of security and confidence in their SCT practices.”

(Y11)

Middle managers foster a culture of continuous teacher learning by offering opportunities for professional development, promoting a growth mindset, and analyzing student learning outcomes while providing teacher performance data. They also facilitate the SECI process within school teams, supporting the sharing of SCT tacit knowledge and documenting externalization through encouraging collegial collaboration, communication, and sharing via the management of Learning Circle. Additionally, they actively participate in the process of combining SCT explicit knowledge to generate new ideas and assist teachers in internalizing SCT explicit knowledge for daily classroom practice, transforming it into their own personal tacit knowledge.

Schools, particularly middle managers, can promote structured and informal sharing of SCT knowledge and expertise during coffee breaks. This study confirms middle managers' crucial role as knowledge producers in energizing *Ba* as suggested by Nonaka et al. (2000b).

4.4.3 Distributed Teacher Knowledge Leadership

Teachers are primary sources of SCT knowledge creation and play active and critical role in the school's KM. Teachers fulfill a crucial role as distributed knowledge leaders in managing classroom instructional practices. In the SECI KM

model, with teachers' knowledge leadership practices as SCT knowledge creators and transferors. Their engagement in the process of creation of SCT knowledge through classroom practice is crucial.

The SCT Learning Circle is regarded by teachers as a major vehicle that can enhance the teacher's distributed knowledge leadership role.

“The Learning Circle successfully enhances my role as a knowledge leader as a teacher. It enables me to help other novice teachers through engaging in mutual sharing, learning from each other's teaching methods, observing, and improving relevant SCT experiences, which greatly inspires each of us.”

(Y10)

Besides, teachers also play an essential knowledge leadership role in SCT implementation, they co-create supportive and engaging learning environments with middle managers, share SCT knowledge and experiences with fellow teachers, monitor student progress, adapt teaching strategies, and continuously improve their SCT skills and knowledge. Teachers optimize student learning experiences and ensure effective SCT implementation.

It is the teacher who translates the school's knowledge vision and policies into actionable plans for effective classroom implementation, this involves incorporating Galton's six SCT principles, designing appropriate learning activities, providing

effective feedback and articulating AfL, and adapting pedagogical strategies for personalized learning experiences.

Teachers monitor student progress, analyze data, identify areas needing support, and adapt teaching strategies for optimized student learning, ensuring all students have opportunities to succeed in the SCT learning environment. Their knowledge leadership role in SCT implementation involves continuously improving their pedagogical skills and SCT knowledge through teacher learning, self-reflection, seeking feedback and coaching from peers and subject-panels. This ensures they provide the best learning experience for their students.

Teachers promote socialization by creating opportunities for informal SCT knowledge sharing and collaboration, such as peer observation, feedback sessions, teacher-led workshops, seminars, and Learning Circle.

Teachers support internalization by providing feedback and coaching, participating in peer observation and post-lesson review sessions, and supporting self-reflection, continuously improving colleagues' SCT pedagogical skills.

In summary, teachers' distributed knowledge leadership role involves facilitating the SECI process among colleagues, promoting socialization and supporting internalization. This creates a culture of continuous teacher learning, supports effective SCT implementation, and fosters professional growth among colleagues.

4.4.4 The relationship between the three-tiered Knowledge Leaders

The roles among the three-tiered knowledge leaders are complementary and professionally interdependent. Successful implementation of SCT cannot be achieved by principal, vice-principals and PSMCD as centralized knowledge leaders, middle managers as situational knowledge leaders, or teachers as distributed knowledge leaders alone. All knowledge leaders need to work together to achieve the school's goal and knowledge vision. Despite hierarchical differences, the roles among the three-tiered knowledge leaders are complementary, interconnected, and professionally interdependent, especially when their shared knowledge vision aims to maximize student learning. Teacher professional learning cannot be accomplished solely through the administrative imperatives of the centralized knowledge leaders; it is driven by professional motivation since teachers' professional learning is a voluntary act that falls outside the administrative authority of centralized knowledge leaders. They are professionally interconnected and have promotive interdependent relationships.

Below is an empirical model of three-tiered knowledge leadership (See Fig. 4.9) in the process of school SCT knowledge creation: using the SECI model as an analytical lens, adapted from von Krogh et al. (2012, p.258). The empirical framework of the three-tiered knowledge leadership in the process of school SCT

knowledge creation utilize the framework of centralized knowledge leadership, situational middle managers' knowledge leadership, distributed teacher knowledge leadership and direct their connection to *Ba*, SECI knowledge creation process, and knowledge assets which aligns with Von Krogh et al. (2012). Study findings support Liu's (2019) argument that successful educational reform depends on fostering teacher collaboration and professional dialogue, allowing for the externalization and mobilization of distributed tacit knowledge, rather than relying solely on administrative measures to enforce agreement and rapid change.

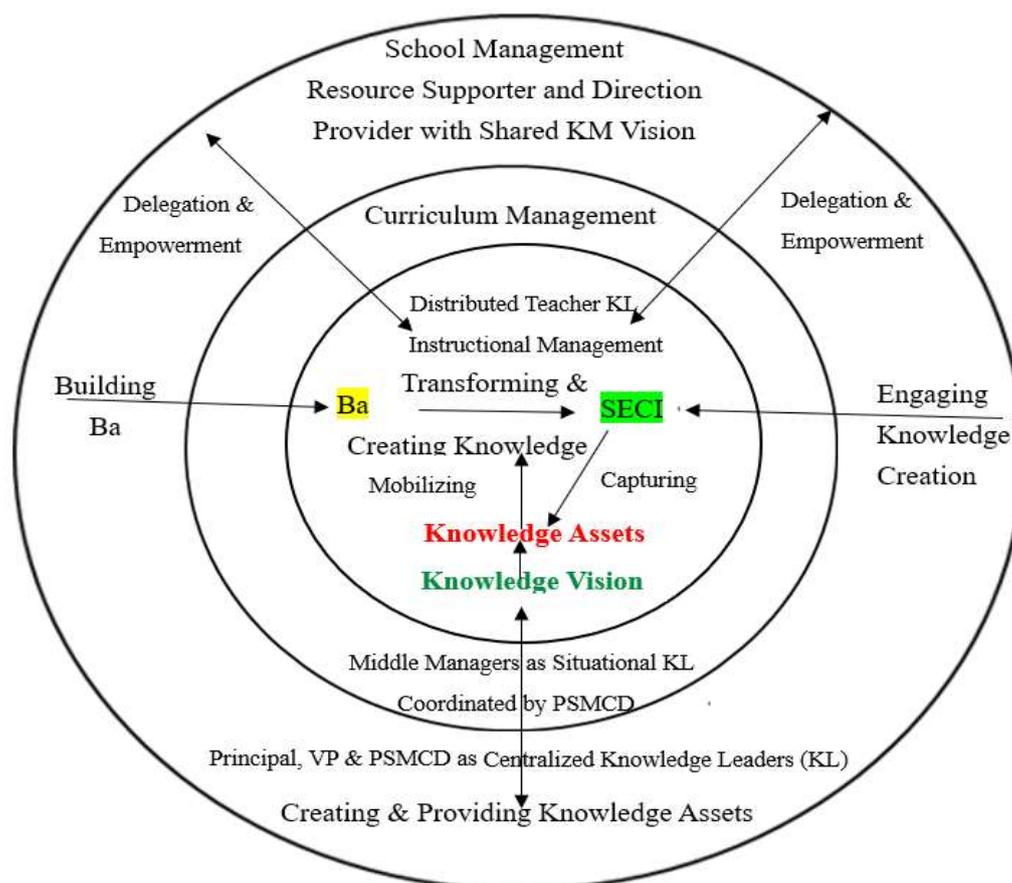


Fig. 4.9 An Empirical framework of Three-tiered Knowledge Leadership in the process of School SCT Knowledge Creation: Using the SECI Model as an Analytical Lens. Adapted from von Krogh et al. (2012, p.258)

It encompasses multiple leadership strata within a school and includes three layers of knowledge creation activities corresponding to the three levels of PDCA cycle of the Learning Circle. For the school management layer represent the centralized knowledge leaders like principal, vice-principals, and PSMCD to provide resources, support, overall frame, and direction for SCT knowledge creation under the guidance of shared knowledge vision. They facilitate the cross-curricular combination of SCT explicit knowledge.

For the curriculum management layer, the middle managers as situational knowledge leaders collaborate under the coordination of PSMCD, they serve as change agent and facilitator to offer SECI context for knowledge creation. They facilitate the externalization of SCT explicit knowledge at the subject-departmental level.

For the instructional management layer, teachers serve as distributed knowledge leaders. They take the lead and engage in the SCT knowledge creation process. They facilitate the socialization and internalization of SCT tacit knowledge at the individual teacher level (See Fig. 4.12).

KM serves as a pioneering force in organizational learning, driving organizational affairs, and functioning as an essential tool for learning organizations as suggested by Dahou et al. (2019). Within a school context, the knowledge leaders

play a pivotal role in managing these KM processes.

In this study, the findings highlight the importance of delegating decision-making authority to distributed teacher knowledge leaders, particularly in areas such as departmental curriculum development and classroom instructional practices, as a means to empower them and foster a greater sense of ownership and shared responsibility within the school system, which aligns with Cheng's research findings (2008a, 2008b). By actively delegating teachers in decision-making processes related to instructional practices, curriculum development and school management, centralized knowledge leaders can cultivate an inclusive and collaborative environment.

Building upon Cheng's arguments above, this study's findings indicate that when centralized knowledge leaders delegate and empower middle managers and teachers as knowledge leaders in the curriculum and instructional layers, it enables them to access and utilize SCT knowledge. This empowerment not only allows them to demonstrate and propagate the power of such knowledge but also facilitates the activation of the school's SCT knowledge assets.

The three-tiered knowledge leaders have significant effects on the creation, processing, sharing, and storage of SCT knowledge, thereby embedding continuous teacher learning within the school's culture. knowledge leaders in the knowledge

creation processes (See table 4.8).

Table 4.8 Nature, Roles, and Responsibilities of Three-tiered Knowledge Leadership in the implementation process of SCT Learning Circles

Three-tiered and Nature of Knowledge Leadership [↵]	Distributed Teacher Knowledge Leadership at Instructional Management layer	Co-ordinated and Managed [↵] by PSMCD [↵]		Centralized Knowledge Leadership School Management layer [↵]
		Mediating role of Middle Manager & their situational Knowledge Leadership at Curriculum Management layer		
Staff Personnel & Responsibility	Teacher	Subject Panel	Prefect of Studies	Principal/ Vice- Principals and PSMCD as Senior Management Team [↵]
Role [↵]	Active and participative Knowledge Creator and Sharer [↵]	Facilitator SCT knowledge creation	Change agent and context Provider for SCT knowledge creation	Resources Provider, Trust Relationship Builder, Culture Builder, KM conditions enabler, “System thinking” Promotor, and Overall Frame and Direction Provider with Shared KM Vision [↵]
Mission [↵]	Socialize, and Internalize SCT Knowledge and Share responsibilities [↵]	Validate and Externalize SCT Knowledge, Organize SCT Learning Circles	catalyze SCT interactions, Organize SCT cross-curricular sharing and facilitate SCT Knowledge Combination	Delegate, Empower and Disseminate the SCT good Practices
Goal Setting	Participate, contribute in SCT Learning Circles for Knowledge Creation at Instructional Management	Define the scope, prioritize, and set expected SCT and Student Learning outcomes	Co-ordinate subject panel tasks at Curriculum Management	Define SCT objectives and Areas of Concern and Improvement at School Management

Resources Management [↔]	Make an optimal use of SCT resources or share them [↔]	Thrash out SCT program budgeting SCT plans and source relevant SCT resources [↔]	Allocate SCT resources [↔]	Approve SCT budget, seek for new SCT resources [↔]
Tasks and Roles under the Area of Collaboration [↔]	Co-construct and create SCT technological pedagogical knowledge (TPACK) for e-learning (e.g., Organize collaborative lesson planning sessions) [↔]	Facilitate coordination at the subject panel level [↔] (e.g., Organize collaborative Post lesson Review and Sharing sessions) [↔]	Provide appropriate frameworks (e.g., Making SCT Learning Circle Guideline and Organize collaborative cross-curricular lesson sharing sessions) [↔]	Create capacity for collaboration (including Promoting “System thinking”, building shared Vision, Culture of knowledge sharing, high-collegial Trust, being a role model, providing School’s Professional Development, Partner’s Support, Infra-structure & administrative practices (resources, staffing, timetabling), and forming appropriate SCT Policy [↔]
Tasks and Roles under the Evaluation [↔]	Implement and Feedback [↔]	Analyze and Modify the Plan [↔]	Monitor and Feedback [↔]	Evaluate and Plan next Action [↔]

Adapted and adopted from the Secondary Education Curriculum Guide (Chapter 11, p.22) (HKCDC, 2017)

This study highlights the importance of teacher’s professional autonomy coupling with shared accountability and responsibility that all teachers should undertake, fostering a culture of shared and professional knowledge leadership within the school to promote student learning. The findings suggest that a shared knowledge leadership culture promotes effective implementation of KM and facilitates the creation of SCT knowledge. The table 4.8 discuss the nature, roles and

responsibilities of three-tiered knowledge leaders. Within schools, SCT knowledge leaders can assume various roles. Centralized knowledge leaders such as principals, vice-principal, and PSMCD can work together as SMT to play collaborative effort to set the direction of the school's KM shared vision, facilitate SCT knowledge combination, offer SCT teacher learning opportunities, and advocate for SCT policies and practices that enhance student learning and success; middle managers as knowledge leaders can encourage SCT knowledge externalization, serve as mentor to promote SCT knowledge sharing, help to validate SCT knowledge for the teachers to learn, be a role model of continuous teacher learning and leveraging SCT knowledge, implement SCT curricula; teachers as knowledge leaders can share SCT knowledge, join the SCT learning circle, enhance SCT knowledge socialization, and engage in SCT knowledge internalization.

By leveraging their SCT expertise and knowledge, these knowledge leaders contribute to fostering a culture of knowledge sharing, continuous learning and professional growth that benefits students, teachers, and the entire school community.

4.5 Six different roles of Knowledge Leadership

There are six different roles of knowledge leadership.

4.5.1 Allocating areas of expertise/advisers

To promote effective collaboration and knowledge sharing, knowledge leaders

should assign areas of expertise and advisors to team members, while clearly communicating expectations for each member's role. At Y School, Y1 assigns panel heads with abundant SCT knowledge to lead teachers in implementing SCT Learning Circle for optimized student learning. Panel heads play a crucial role in validating SCT knowledge, essential for SCT knowledge creation, and transfer.

4.5.2 Role Model

To promote continuous teacher learning and knowledge sharing within a team, role modeling is crucial in boosting teachers' motivation. At Y School, Panel Heads and senior teachers establish a safe and trust environment for knowledge sharing, inspiring novice teachers to utilize open classroom for professional discussions and teacher learning. Additionally, under the leadership of Y1 (who always opens her classroom for colleagues to join when she was working as PSMCD), Y4, Y5, and other knowledge leaders (such as Y6, Y7, Y8, Y9, Y10 and Y12) actively encourage the sharing of SCT tacit knowledge and the enhancement of teaching skills through open classroom initiatives. The principal's role modeling has a convincing and effective impact on SCT implementation at Y School.

4.5.3 Relational role in building collegial cooperation and trust

Knowledge leaders use relational strategies to create a cooperative and trust-based working context. Prioritizing the establishment of mutual trust and a high level

of commitment can help knowledge-creating schools achieve SCT knowledge and attain their knowledge vision. The principal of Y School is very successful in cultivating mutual trust and collaborative culture of knowledge sharing which contribute to the SCT knowledge creation and transfer.

“Building relationships during teachers’ conversations is crucial for promoting knowledge sharing. Colleagues sharing successful examples of SCT knowledge sharing are encouraging. I learned the importance of valuing relationship building from the principal, who prioritized relationship leadership in PSMCD.”

(Y5)

4.5.4 Building enabling conditions

Knowledge leaders enable effective SCT knowledge creation and transfer. They promote teacher group characteristics and processes such as diversity, argumentation, politeness, and shared positioning to facilitate knowledge creation. Diverse teacher groups generate more ideas, representations, justifications, and solutions. Knowledge leaders must build enabling conditions for SCT knowledge creation and transfer.

To create enabling conditions for KM, knowledge leaders need to foster a culture of knowledge sharing, provide teacher learning opportunities, encourage collegial-trust and collaboration, recognize and reward knowledge sharing, and use

technology. These conditions lead to improved school performance and better learning outcomes for students.

4.5.5 Creating social capitals

Effective KM requires social capital, facilitated by knowledge leadership. Horizontal network interactions are more effective than traditional hierarchical mechanisms in fostering KM. Y1 successfully creates social capital for knowledge creation and transfer through building trust, encouraging collaboration, fostering a learning culture, and creating a supportive environment. As a centralized knowledge leader, Y1's efforts lead to improved school performance and better student learning outcomes.

4.5.6 Vision and Culture builder

Centralized knowledge leaders play a vital role in developing shared vision and shaping the organizational culture to promote knowledge sharing and support different knowledge activities. Therefore, they are essential in enabling and facilitating knowledge activities. Y1 was excellent in building shared knowledge vision and culture.

4.6 Three-tiered Knowledge Leadership that corresponds to the three levels of the PDCA cycle in the Learning Circle

The Learning Circle's collaborative PDCA cycle can be applied at various levels:

individual, subject-department, and school. The three-tiered knowledge leadership can operate and correspond to the three-levels of PDCA cycle of Learning Circle.

4.6.1 The individual teachers level PDCA cycle of SCT Learning Circle that works under the Distributed Knowledge Leaders

In the SECI model, the individual teachers level PDCA cycle of SCT Learning Circle is part of the process of knowledge socialization and also part of the process of knowledge internalization as well. The individual teachers PDCA cycle supports the socialization of SCT knowledge in the Plan phase and facilitates the internalization of knowledge in the Do phase. These individual teachers work as distributed teacher knowledge leaders and collaborate to develop SCT PCK during lesson planning meetings and engage in knowledge socialization by sharing their SCT tacit knowledge, aiming to facilitate SCT implementation. The findings through interviews support Dudley's (2013) argument that teacher communication within the context of LS offers an opportunity for teachers to access their tacit knowledge reserves.

In the Do phase of the SCT learning circle, individual teachers utilize explicit SCT knowledge in their lessons. The PDCA cycle empowers teachers to approach their work in a logical and systematic manner, fostering critical thinking. Through the ongoing and spiral process of the PDCA cycle, teachers as distributed knowledge leaders can progressively approach their desired SCT objectives and enhance student

learning.

At an individual teacher's level, the PDCA process enhances teachers' personal mastery, as the pursuit of personal mastery is a crucial aspect of seeking continuous improvement. Y School nurtures a collaborative culture of knowledge sharing and continuous instructional improvement, motivating teachers to strive for pedagogical professionalism and cultivate practical wisdom to internalize Y School's explicit SCT knowledge as personal tacit knowledge. The findings through interviews corroborate Asbari et al.'s (2019) argument that fostering extensive participation of all teachers is crucial for effectively managing school education institutions. This includes facilitating the sharing of knowledge, both tacit and explicit. The concept of an individual teacher's level of Learning Circle connects the subject-departmental and school-level PDCA cycles of the SCT Learning Circle, creating a professional learning community, which aligns with the perspective provided by Cheng (2019a).

The examples below illustrate the modifications in SCT pedagogical knowledge resulting directly from the explicit articulation of previously tacit knowledge. Two specific examples of SCT knowledge socialization can be found in the interview data of Y6 (See page 211) and Y10 (See page 211). The SECI model involves teachers' knowledge leadership practices as SCT knowledge creators and transferors. This leads to effective SCT knowledge socialization and internalization during the

management of instructional classroom practices. It operates at the individual teachers' level through the PDCA cycle.

4.6.2 The subject-departmental level PDCA cycle of SCT Learning Circle that works under the Situational Knowledge Leaders

Within Y School, the Prefect of Studies, core Subject-panel Heads, and Vice-panel Heads, who operate under the coordination of the PSMCD, serve as SCT knowledge facilitators and act as teaching mentors for novice teachers. The subject-departmental level of the SCT Learning Circle at Y School function through multiple PDCA cycles within each subject panel. The objective is to foster the development of PCK to improve student learning and effectively manage the departmental SCT curriculum plans (See Figure 4.10).

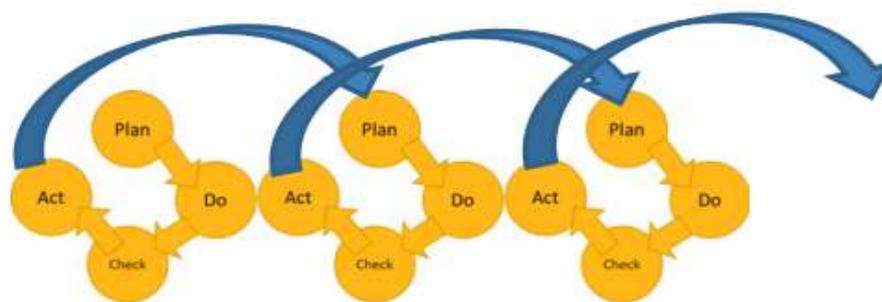


Fig. 4. 10 Subject-departmental PDCA cycle for managing PCK adopted from Cheng (2019a, p.50)

The Plan phase of the subject-departmental Learning Circle commences with SCT instructional design for implementing subject-level SCT lesson plans. During this stage, teachers convene regularly to discuss students' learning difficulties, select

a teaching unit for SCT research lessons, and formulate SCT lesson plans. They collaborate on implementing the subject-level SCT lesson plans, leveraging their collective tacit knowledge through teacher interaction and professional dialogue. Within the same contextual framework, the socialization process of SCT knowledge takes place during the planning stage, involving conversations and exchanges of SCT tacit knowledge among individual teachers. The teacher responsible for implementing the SCT research lesson incorporates teaching strategies into the SCT lesson plan to address student learning challenges. The teachers externalize their SCT tacit knowledge by incorporating it into the SCT lesson plans and sharing it with their colleagues.

A pre-lesson meeting is arranged, where the teaching team consisting of teachers from the same grade or subject panel gathers to provide comments and suggestions. At Y School, teachers engage in discussions, clarifications, and integration of team members' ideas, refining the draft SCT lesson plans that encompass the collective SCT explicit knowledge of the group.

In the Do phase, the SCT lesson plan and teaching materials are put into action through SCT lesson implementation. The subject-panel documents the lesson and assesses students' learning.

In the Check phase, a post-lesson review takes place. During this stage, data is

collected, scripted lesson documents are examined, and the development and learning processes of students are evaluated. The results are analysed to determine the appropriateness of the SCT lesson's objectives, methods, and structures. The teaching ideas generated are then applied and assigned to daily lessons in the Act phase, facilitating the internalization process of SCT knowledge.

The subject-departmental PDCA cycle within the Learning Circle involves teachers belonging to the same subject-panel. Their objective is to determine the PCK specific to their subject in order to effectively implement the subject's SCT lesson plans in accordance with the school's SCT policy. The knowledge scope of the SCT Learning Circle team is confined to the SCT PCK relevant to the implementation of subject-specific SCT lesson plans. Typically, all subject teachers are expected to incorporate this approach into their lessons and assess student learning progress and effectiveness. This single PDCA cycle is repeated as teachers systematically plan their SCT lessons and refine their teaching methods to enhance future lessons. Within the subject-departmental SCT Learning Circle, teachers prepare their SCT lesson materials and undergo three to four cycles of instructional improvement and refinement for their SCT lessons in Y School.

The example provided below highlights the utilization of new forms of knowledge in classrooms and their transfer from one classroom to another. This

emphasizes the significance of collecting and analyzing explicit knowledge derived from tacit knowledge and converting it into tangible artifacts of pedagogical practice guidance through KM processes. The following interview data aligns with the data from lesson observations analysis of Y12 as well as documentary review (See Appendix six).

“One example of externalization of Math lessons is as follows: When experienced teachers share their teaching experiences with novice teachers, the most important vehicle is the learning circle. During that time, we all come together to discuss how to teach a particular difficult topic. In this process, we choose topics that may not have had ideal teaching effectiveness in the past, and we discuss and try to find new methods. Our teachers then conduct research, looking at how others teach, including methods used in Singapore or different schools in HK. Let me give you an example from this year. We were teaching students how to fold a square cube piece of paper (origami worksheet) . We were considering how to help students remember so many steps. Our teachers had a discussion and came up with a classification system that we created internally. This method was something we didn't see in other schools. It was a method we found through our own deduction and discussions. We categorized it into four types after our

discussions, and we call it “141”, meaning the first row horizontally has one unit, the second row has four units, and so on. The second category is “132”, where it’s three units followed by two units, and so on. The third category is like stairs, “2233”, using these numbers as coding for the patterns, making it easier for students to remember. This is something we created in our school, our own IC. We store these PowerPoint presentations in our teaching materials library, and we reuse them every year.”

(Y12)

The study reveals that professional dialogue and collegial-trust among subject teachers play a crucial role in fostering the knowledge-sharing process within the subject-level Learning Circle. Professional dialogues serve as a platform for individuals to reflect on their own practices and enhance student learning. Collegial-trust is closely associated with knowledge sharing, as without it, the effectiveness of SCT knowledge sharing within the Learning Circle team is diminished. Through the PDCA processes, teachers collaborate in teams and hold regular meetings to discuss SCT learning objectives, devise concrete SCT lessons, observe the implementation of SCT lessons in practice, and subsequently revise and report on the outcomes. This enables other teachers to acquire new insights or even generate fresh SCT knowledge through their own practical research. The process of making SCT tacit knowledge

explicit encompassed more than simply transforming the intangible into the tangible. Engaging in professional exchange and dialogue within the SCT learning circle appeared to enhance teachers' metacognitive awareness of their SCT instructional practices which aligns with the findings of Brevik (2014).

The middle managers at Y School concur that their role in promoting the practices of professional dialogue, enhancing the formation of collegial-trust, and facilitating the creation of SCT knowledge is a result of the principal's deliberate delegation and empowerment.

Teachers at Y School experience numerous benefits by engaging in the Learning Circle, including the development of heightened awareness and deeper insights into their students and their individual needs. Through their participation, teachers become more attuned and responsive to their students' prior knowledge, and they approach the learning objectives of SCT lessons with a deliberate analytical mindset, considering the alignment with their students' existing knowledge. The subject-department Learning Circle operates within four core subject-panels at Y School.

SECI model with the middle managers' situational knowledge leadership role as knowledge creation facilitators promote the creation and transfer of new SCT knowledge, leading to effective SCT knowledge externalization in the process of managing SCT lesson plans with PDCA cycle that operate at subject-department level.

Within the subject-departmental Learning Circle, teachers participate in the process of converting SCT tacit knowledge into explicit knowledge, which is then documented as SCT lesson plans and teaching materials during the subject-department level of the PDCA cycle. This conversion process is known as knowledge externalization.

4.6.3 The school level PDCA cycle of SCT Learning Circle that works under the

Centralized Knowledge Leaders

Centralized knowledge leaders play a critical role in creating a conducive environment that encourages individual and team learning. They also provide SCT development direction and define SCT objectives and areas of concern and improvement at the school management level. They support and encourage a culture of creating, sharing, using, promoting, and acquiring new SCT knowledge in the school, aligning with the insights provided by Cheng (2019a) and Kazak (2021).

The principal, vice-principals, and PSMCD, playing an essential role in knowledge leadership as enablers of the KM conducive conditions. SECI KM model with the centralized knowledge leaders' role as SECI context builders facilitates the creation and transfer of new SCT knowledge, leading to effective SCT knowledge combination in the process of managing cross-curricular knowledge practices with PDCA cycle that operate at school-level level.

In Y School, to ensure the effective implementation of the overall school SCT policy, each subject-department PDCA cycle is harmonized and synchronized with a school-level PDCA cycle. The school-level PDCA cycle acts as the central driving force, guiding the subject-level Learning Circle cycles within the school's curriculum management mechanism under the coordination and supervision of PSMCD. During the school-level PDCA cycle, teachers from various subjects collaborate to develop SCT PCK, which is crucial for successfully executing the school's SCT policy. The school-level Learning Circle serves as a process of integrating knowledge by combining the explicit SCT PCK generated by each subject into a comprehensive and explicit knowledge framework at the school level. This framework facilitates the management of the school's SCT policy.

Below is an example of Y School. Before the start of the school year, teachers at Y School engage in discussions regarding teaching strategies for developing reading skills across the curriculum.

During these discussions, they identify *“teaching students how to read and learn from reading”* as hypothetical teaching strategies to be tested and implemented in their classes. *“Different learning domains/subject groups communicate with each other and collaborate to promote reading based on students' learning needs. This includes selecting reading materials, setting reading goals, organizing reading*

through reading. The second principle is that all teachers, regardless of their subject, should instruct students on how to read and learn from reading within their respective teaching domains. Under the coordination of Y5, the reading strategies from the library study are applied consistently across the Chinese Language and English Language subjects, while the General studies supplements with scientific knowledge. These strategies are also put into practice in the Civic and Moral Education.

There are different learning themes from Primary one to Primary six. In the lower grades, there will be oral sharing of books to enhance students' interest in reading, broaden their reading horizons, and increase their reading volume. In the upper grades, project-based learning will be conducted to enhance the depth of students' reading.

The subject teachers made efforts to ensure that their reading strategies and implementation of lesson plans were in line with the school-level curriculum plan. The implementation phase of the school-level Learning Circle was synchronized with the operation of all subject-level Learning Circle cycles. The lesson implementation within the school-level Learning Circle took place after several cycles of the subject-departmental Learning Circle had been completed. The lesson plans and materials showcased during the open lessons were developed through a series of subject-level PDCA cycles.

The subject-departmental Learning Circle developed a final research lesson (See Appendix ten: Primary six unit lesson plans of Reading across the Curriculum), which was then shared with teachers from various subjects for checking purposes. These research lessons aimed to showcase teaching strategies and PCK related to the development of reading skills to teachers from different subjects. The observers evaluated the effectiveness of the reading strategies and materials in enhancing student engagement in learning. During the Check phase of the school-level Learning Circle cycle, a whole school professional development meeting was organized to synthesize the reading strategies from each subject.

“Cross-disciplinary collaboration is powerful, and the driving force mainly comes from bottom-up initiatives. The main reason is that our colleagues believe in and are deeply convinced that cross-disciplinary collaboration among teachers can substantially help students’ learning. Once teachers feel that “it’s good and feasible”, they will take action. Of course, our school policies promote the use of integrated knowledge and generic skills by students, so there is a top-down initiative from the principal and a bottom-up initiative and participation from teachers. The key is the mediating role played by PSMCD, the vice principals and the role of the subject panel as middle manage. The participation of the

teachers as distributed knowledge leaders are vital. The power of relevant professional judgements and decisions are respected by the school's principal. The initiative of cross-disciplinary collaboration lies in the teachers' voluntary participation, which is successful because it does not require the school to push too hard. We have successfully promoted the combination of SCT knowledge across different subjects. This is a trend and cultural characteristic of our school's curriculum development."

(Y4)

The findings obtained through interviews align with Liu's (2019) argument that school leaders and middle managers should not use administrative measures to enforce agreement and rapid change. Instead, they should focus on enabling mutual learning and respecting teachers' professional judgment and classroom instructional decisions. This can be achieved by enriching teachers' repertoires for learning and professional development.

"Teachers fulfill a crucial role as in managing classroom instructional practices. Their direct creation of SCT knowledge through classroom practice is vital. While teaching plans and materials are collaboratively created in the Learning Circle, frontline teachers still have autonomy to internalize their understanding through lesson practice and adjust them to

meet their students' needs. They utilize their SCT knowledge to make judgments and develop personal SCT PCK."

(Y4)

Teachers from Y School participated in a meeting to generate school knowledge regarding reading skills. The collective knowledge from subject-panels at Y School was integrated to form explicit knowledge at the school level, which was then documented in a case report which was co-written with a university partner (See Appendix nine).

During the meeting, teachers had the opportunity to discuss challenges faced while designing reading activities. They were encouraged to create unit lesson plans as a means to capture their discoveries and transform them into tangible teaching materials and artifacts, ensuring the retention of knowledge through SCT knowledge externalization (See Appendix five: Unit Lesson Plan for Learning Circle Collegial Lesson Observation for primary 6 of Y School as an example). Another example of SCT knowledge externalization is the math sharing on their innovative SCT pedagogy by novice Math teacher Y12 in the cross-departmental meeting on how to enhance primary five student learning on the lesson of origami pattern for a cube (See Appendix six). The recorded lesson observation of Y12 was also on this topic. It has been found that the interviewed data provided on page 337 can be triangulated with

the lesson observation data and document analysis data (See Appendix six).

Individual teachers at Y School internalize the school's knowledge of reading across the curriculum by practicing reading strategies in their own classes. Nearly all teachers actively participated in collaborative efforts to enhance their teaching skills, serving as both subject matter experts and specialists in lesson development, while also supporting each other as colleagues within the school.

The school-level Learning Circle has the potential to trigger individual reflection, team reflection, and organizational reflection. The most recent cycle of the school-level Learning Circle at Y School took place from October 2022 to April 2023. During this cycle, the principal, vice-principals, and PSMCD as a centralized knowledge leader brought together PCK from various subjects to implement the school-level reading across the curriculum.

The Check phase of the school-level SCT Learning Circle facilitates the integration of PCK from individual subjects into the school's overall framework. It is crucial for school-level Learning Circle cycles to align with subject-department Learning Circles in order to enhance curriculum management effectiveness and improve the quality of teaching and learning (See Appendix nine and Appendix ten).

The objective of the school-level Learning Circle, as a KM approach, is to identify solutions that address the SCT implementation gap. The study indicates that

the SECI model can explain how individual SCT tacit knowledge can be combined into subject-department and school-level knowledge so as to create knowledge assets. The findings obtained through interviews and documentary review, support the argument made by Asbari et al. (2019) that the knowledge held by individual teachers and schools transforms into intellectual capital, serving as valuable assets that showcase the value of a school.

The SECI model provides a useful analytical framework for understanding how the Learning Circle can be utilized to manage school SCT lesson plans and curriculum (See Fig. 4.12).

The study recommends that primary schools adopt the Learning Circle and the SECI model to implement SCT. The findings, obtained through interviews, lesson observation, and documentary review, all support the argument that the SECI Model effectively empowers tacit knowledge, as suggested by several researchers (Lievre & Tang, 2015; Huang et al., 2016; Norwich et al., 2016; Stanica & Peydro, 2016; Hodgins & Dadich, 2017; Okuyama, 2017; Sasaki, 2017; Baldé et al., 2018; Chatterjee et al., 2018; Li, Liu & Zhou, 2018; Nonaka & Hirose, 2018).

The three-tiered knowledge leaders are crucial in providing leadership practices, creating conducive conditions for the functioning of the *Ba*, initiating the PDCA cycles in the Learning Circle, and facilitating the effective operation of the SECI model.

These actions promote SCT knowledge creation and transfer, thereby impacting Y School's ability to implement SCT policy effectively and bridging the knowledge gap.

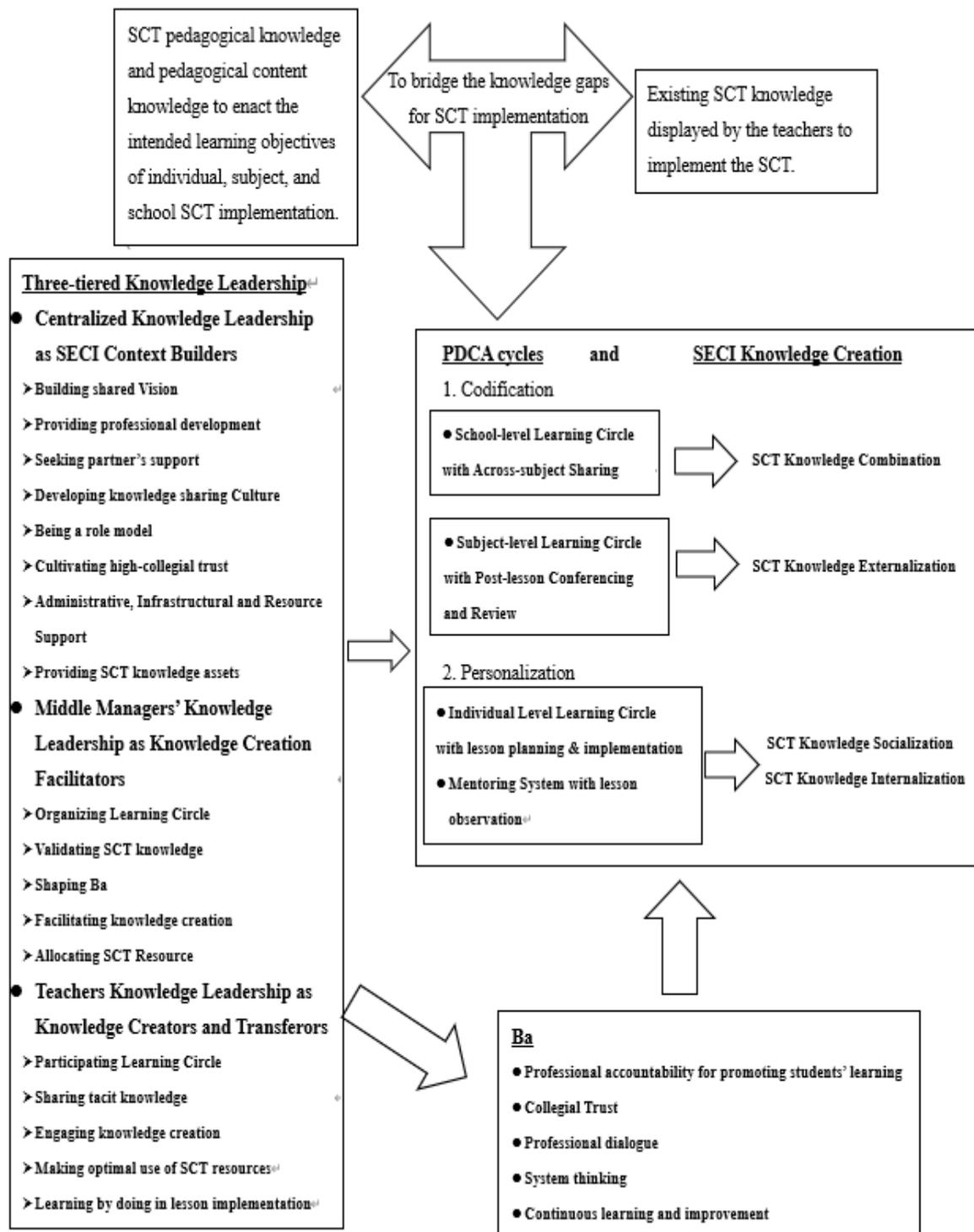


Fig. 4.12 A SECI KM model of SCT knowledge creation and transfer through

conducting Learning Circle adapted and adopted from Cheng (2019a, p.70)

4.7 Chapter Summary

Nonaka's Knowledge Creation Theory is a suitable framework for describing SCT knowledge creation in HK primary schools, as validated by comprehensive evaluation. At Y School, the successful internalization of novice teachers' SCT explicit knowledge is guided by three-tiered knowledge leadership and organizational enabling factors, which institutionalize the SECI mechanism. The teachers' subjective and conscious processes, combined with learning by doing, validate SCT knowledge and transform it into new personal tacit knowledge for future use.

This study develops an empirical model (See Fig. 4.8) showing the relationship between three-tiered knowledge leadership, KM, and SCT implementation in primary schools, as well as a SECI model of SCT knowledge creation and transfer through conducting Learning Circle (See Fig. 4.12). Organizational enabling factors can institutionalize the SECI mechanism for SCT knowledge creation and transfer. Effective SCT implementation requires codification and personalization strategies. KM, guided by knowledge leadership and utilizing Nonaka's SECI model, enhances SCT implementation in primary schools.

KM and the SECI SCT knowledge creation are identified as closely related in this study. KM practices can be used to facilitate and support the SECI process within

schools. KM provides the tools, systems, and processes to enable the capture, storage, retrieval, and dissemination of SCT knowledge across the different modes of the SECI cycle. The SECI model also provides a useful analytical framework for understanding how the Learning Circle can be utilized to manage school SCT lesson plans and curriculum. The study recommends that schools should adopt KM and utilize SCT Learning Circle and the SECI model to implement the SCT.

Chapter 5 CONCLUSIONS & IMPLICATIONS

This chapter concludes the study on the role of KM, SCT Learning Circle and the SECI model to facilitate the SCT implementation in primary schools that are experiencing a rapid and serious decline in student population. It also demonstrates the significance of three-tiered knowledge leadership in promoting the SECI process and facilitating SCT knowledge creation and transfer. The EDB and universities are recommended to promote KM strategies with a focus on enhancing three-tiered knowledge leadership.

The limited generalizability of the research findings and the potential missing of some important research findings are the limitations of this study due to its research methodology and data collection method. Future studies are advised to conduct large-scale quantitative research, and more extensive use of classroom observations as the data collection method, to explore the three-tiered knowledge leadership between KM, SECI model, Learning Circle, effective implementation of SCT, and school educational performance.

5.1 Overview of this study

This study examines the impact of KM on SCT implementation in primary schools and explores the knowledge leadership practices of principals, middle managers, and teachers, *Ba*, knowledge assets, as well as the operation of PDCA cycles of the Learning Circle under the SECI model for SCT knowledge creation and transfer. Its objective is to establish a connection between the three-tiered knowledge leadership practices, KM, and SCT

implementation in primary schools.

The study aims to help primary schools tackle KM and SCT policy implementation issues for quality education. HK primary schools face challenges in implementing SCT, including the need to improve teaching quality in the context of falling student numbers and shrinking classes.

While class size reduction is desirable, research shows that teachers may struggle to change their pedagogical practices. Moreover, the impact of class size reduction in HK has been limited due to teacher-directed teaching styles. This study proposes KM as a solution to these problems and investigates the extent to which Nonaka's SECI model, guided by three-tiered knowledge leadership practices, can improve SCT implementation in primary schools.

This study aims to address the research gap on how KM can enhance three-tiered knowledge leadership practices and organizational factors for successful SCT policy implementation in primary schools. Knowledge leadership is crucial for successful KM implementation in schools, and three-tiered knowledge leadership practices play a primary role in supporting knowledge creation processes for effective SCT implementation. Proper knowledge leadership practices can promote positive knowledge sharing, creation, capture, and transfer. However, there is limited empirical investigation into knowledge leadership practices and roles in school SCT knowledge creation and transfer. This study aims to fill this gap and provide insights into three-tiered knowledge leadership practices for KM

implementation in primary schools.

This study has four sub-questions that explore knowledge leadership practices and organizational factors for effective knowledge conversion and creation processes in socialization, externalization, combination, and internalization, to develop SCT pedagogies.

This research aims to explore the process of SCT knowledge creation and transfer, with a focus on the roles of the three-tiered knowledge leaders in SCT implementation in two local primary schools. To answer these research questions, this study used a cross-case study research methodology with the support of literature. Two aided primary schools in HK, X School and Y School, were purposively selected as cases.

Data was collected through in-depth interviews, documentary reviews, and observations, and analyzed using a mixed method of deductive and inductive coding. The study is guided by the SECI model of knowledge creation and transfer, which functions as an analytical lens for the development and execution of Collaborative Lesson Preparation activities in X School and SCT Learning Circles activities in Y School, respectively. These activities serve as crucial KM tools and strategies for SCT knowledge creation and transfer within the respective schools.

This study analyzed interview, documentary, and observation data to uncover findings on the roles of three-tiered knowledge leaders, the impact of KM on SCT implementation, knowledge leadership practices of principals, middle managers, and teachers for better SCT

implementation, and the influence of three-tiered knowledge leadership practices on KM.

5.2 Summary of findings

The study concludes that the strategies of codification and personalization within KM can assist primary schools in addressing the identified problem and promoting effective SCT implementation. KM not only enhances teachers' SCT competency but also improves the administrative structure and pedagogical policies of the school. Moreover, it helps prevent the loss of crucial SCT knowledge by capturing and retaining the knowledge of experienced SCT teachers and strengthening the SCT knowledge of novice teachers. The research further identifies how teachers, middle managers, and principals enhance knowledge leadership practices and organizational factors that facilitate SCT knowledge creation and transfer.

Three-tiered knowledge leaders in schools play a crucial role in promoting SCT knowledge creation and transfer. The organizational factors that support KM and SECI processes for effective SCT implementation include knowledge leaders as role models, alignment with the school's vision and mission, high collegial-trust, a culture of knowledge sharing, supportive infrastructure, professional development opportunities for teachers, and partner's support. Employing three-tiered leadership practices and organizational factors can institutionalize the SECI model in primary schools for SCT knowledge creation and transfer, enabling effective SCT implementation.

5.2.1 The role of KM in SCT implementation

This study emphasizes the significance of KM strategies in overcoming obstacles to successful SCT implementation in primary schools. It concludes that personalization and codification strategies can help primary schools achieve effective SCT implementation by addressing obstacles in the process.

- Primary schools can use the codifying strategy of KM to review and analyze their SCT implementation. This approach involves preparing and retrieving SCT documents for SWOT analysis, identifying strengths, weaknesses, opportunities, and threats in SCT classroom practices.
- At Y School, the personalization strategy with Learning Circle allowed teachers to create SCT knowledge by facilitating dynamic conversion between tacit and explicit knowledge. KM enables school knowledge leaders to acquire and apply SCT knowledge resources for effective lesson preparation and teaching in the school context.
- This study defines school KM as a mechanism that enables three-tiered knowledge leaders to acquire, share, create, transfer, apply, and internalize knowledge, drawing on existing research by Cheng (2015a, 2019a) and Cheng & Hu (2020). This approach equips teachers for effective lesson preparation and teacher learning through Learning Circle, helping schools proactively address challenges.

KM is essential in overcoming obstacles and promoting effective SCT implementation in primary schools using codification and personalization strategies. At Y School, KM under three-tiered knowledge leadership can promote sustainable school development by addressing SCT implementation issue, under-enrollment and the risk of school closure.

5.2.2 The Influence of the Knowledge Leadership Practices on SCT knowledge creation and transfer

The SECI model is used to analyze the situation at X and Y Schools and demonstrate how the effective implementation of SCT is promoted through teacher learning, thereby maximizing students' learning. The study's conclusion suggests that the Learning Circle and the SECI model, under the three-tiered knowledge leadership, can effectively address the challenges of implementing SCT in primary schools in Hong Kong (see Fig. 4.12).

Dudley's (2013) study demonstrated how deliberate and collaborative processes in LS which serve the similar purpose of the learning circle enable teachers to access, apply, and transfer the tacit knowledge to address the issue on how to enhance students' learning which aligns with this study's findings.

“I strongly agree that the Learning Circle is effective and particularly helpful in term of socialization and internalization for novice teachers. The SCT Learning Circle offer opportunities for us to learn tacit knowledge from others. When we discuss different teaching opinions, we can exchange different suggestions on

teaching through the Learning Circle. Only through the collision of these opinions can we achieve better classroom instructional practices through internalization.”

(Y10)

Liu (2019) suggests that the key to achieving success in educational reform lies in establishing avenues for teacher collaboration and professional dialogue, enabling the externalization and mobilization of distributed tacit knowledge which aligns with this study’s findings.

“My teaching mentor was very helpful in my acquisition and transfer of SCT tacit knowledge. I observed my teaching mentor’s lessons two to three times, which made me familiar with the use of SCT pedagogies. This trusted relationship gave me the confidence to conduct my own teaching and invited my teaching mentor to observe my classes and pave the way for professional dialogue, which further accelerated the SCT knowledge internalization process.”

(Y12)

This study identifies that the SECI knowledge creation process, within the ‘PDCA’ cycle for the Learning Circle at individual, departmental, and school levels, facilitates teacher learning and optimizes student learning, aligning with the research findings of Dudley (2013) and Liu (2019).

The principal at Y School, together with the vice-principals and PSMCD, initiates the

SCT Learning Circle and formally establishes it as school's major concern one in the school's 2018-21 and 2022-24 school development plans. They play a crucial role as centralized knowledge leaders. The three-tiered knowledge leadership at the school management layer, curriculum management layer, and instructional management layer are explained as follows.

The SCT Learning Circle is led and engaged by teachers who act as distributed knowledge leaders, serving as SCT knowledge creators and transferors at the classroom instructional management level. Additionally, the SCT Learning Circle is managed by middle managers who act as situational knowledge leaders, facilitating SCT knowledge creation and transfer at the subject-departmental curriculum management level. The SCT Learning Circle at Y School is initiated and established by the principal, vice-principals, and PSMCD. They are centralized knowledge leaders responsible for building *Ba* and providing knowledge assets. The SCT Learning Circle facilitates the contextual SECI SCT knowledge creation and transfer process at the school management level.

Furthermore, the study identifies that SECI KM model facilitates the process of SCT knowledge creation and transfer, leading to enhanced socialization of SCT tacit knowledge and the internalization of school's SCT explicit knowledge into personal tacit knowledge. This, in turn, helps individual teachers achieve personal mastery through SCT tacit knowledge sharing and classroom practices. Additionally, it promotes more effective externalization of SCT knowledge at the departmental level and facilitates easier cross-disciplinary combination

of SCT knowledge at the school level.

While centralized knowledge leaders at Y School foster “systems thinking” and provide direction for the school’s development through the cultivation of a shared knowledge vision, they also serve as a role model for colleagues, emphasizing knowledge as the school’s most valuable resource. This is achieved by initiating a knowledge audit before formally implementing KM in Y School. The centralized knowledge leaders foster a high level of collegial-trust in the school context, creating conducive conditions for shaping originating *Ba* that facilitate knowledge sharing. They also cultivate a collaborative culture of knowledge sharing by establishing a system of praise and rewards to encourage SCT knowledge sharing.

Additionally, the centralized knowledge leaders facilitate the development of shared understanding and a common language of SCT through the use of SCT lesson observation evaluation and appraisal forms based on Galton’s six SCT principles, thereby enhancing communication. They also prioritize the provision of knowledge assets and the development of administrative arrangements, approve budgets, seek new resources, and leverage ICT for the dissemination of SCT knowledge, networking, and seeking partners’ support.

The centralized knowledge leaders initiate the use of the SCT Learning Circle as a crucial platform for SCT knowledge creation, formally establishing SCT Learning Circle as the major concern one in the school’s 2018-21 and 2012-24 school development plans. The SCT Learning Circle effectively serves as a powerful engine for enhancing teachers’ culture

of continuous teacher learning and ongoing instructional improvement. SECI KM model with the three-tiered knowledge leadership practices facilitates the creation and transfer of new SCT knowledge.

The middle managers as situational knowledge leaders take the role as change agent and knowledge creation facilitators, they promote the creation and transfer of new SCT knowledge, leading to effective SCT knowledge externalization. This occurs in the process of managing SCT lesson plans and the school's curriculum.

The teachers' distributed knowledge leaders serve as SCT knowledge creators and transferors, this leads to effective SCT knowledge socialization and internalization in the process of managing instructional classroom practices.

In summary, the finding of the study shows that the presence of three-tiered knowledge leaders is vital as they provide leadership practices, establish conducive conditions for the functioning of the *Ba*, provide knowledge assets, initiate the PDCA cycles in the SCT Learning Circle, and facilitate the effective operation of the SECI model. These actions play a significant role in promoting SCT knowledge creation and transfer, ultimately impacting Y School's ability to implement SCT policy effectively and bridging the knowledge gap (See Figure 4.12).

5.2.3 The Influence of the Knowledge Leadership Practices on SECI operation

This study finds that three-tiered knowledge leadership practices and organizational

factors positively influence KM initiatives for effective SCT implementation. Leadership practices include setting the school's knowledge vision, being a role model, developing collegial-trust, fostering a culture of knowledge sharing, establishing administrative arrangements, using ICT, promoting teacher development and appraisal, and seeking partners' support. These leadership practices help schools utilize codification and personalization strategies and enhance the effective implementation of SCT policy.

This study develops an empirical model on three-tiered knowledge leadership practices for KM and effective SCT implementation (See Fig. 4.8), as well as a SECI model of SCT knowledge creation and transfer through conducting Learning Circle (See Fig. 4.12). Implementing the models can enhance educational performance and provide quality education, helping to tackle under-enrollment and the risk of school closure.

The study indicates that the SECI model can be applied to explain how individual SCT tacit knowledge can be combined into subject-department and school-level knowledge. The SECI model provides a useful analytical framework for understanding how the Learning Circle can be utilized to manage school SCT lesson plans and curriculum. The study recommends that primary schools adopt SCT Learning Circle and the SECI model to implement the SCT.

The study identifies that the three-tiered knowledge leadership, corresponding to the three levels of PDCA cycles in the Learning Circle, can work together with SCT knowledge

assets and *Ba* to facilitate the process of SCT knowledge socialization, externalization, combination, and internalization. This collaborative effort promotes the conversion and creation of both SCT tacit and explicit knowledge.

5.2.4 Fostering Effective Knowledge Conversion and Creation for SCT Pedagogies

The following sections illustrate how the three-tiered leadership practices and organizational factors that enable the four modes of socialization, externalization, combination and internalization of SCT knowledge creation and transfer.

5.2.4.1 Enabling Socialization of SCT Tacit Knowledge among individual teachers

The knowledge leadership practices and school organizational factors that enable the socialization process of SCT tacit knowledge include:

1. To establish the teachers' distributed knowledge leadership: School teachers' distributed knowledge leaders enacting the face-to-face teacher interaction and collegial-trust that enhance SCT tacit knowledge and skills sharing and transfer.
2. To establish the Learning Circle: School centralized knowledge leaders institutionalize SCT Learning Circle that enables teachers to share their SCT tacit knowledge, experiences, and good SCT classroom practices.
3. To establish the mentoring and coaching system with shadowing and observation system: School centralized knowledge leaders establish a mentoring and coaching system that incorporates collegial lesson shadowing and observation, providing opportunities for

teachers to learn from each other's SCT tacit knowledge and skills. This arrangement effectively facilitates the socialization of SCT tacit knowledge.

4. Grade-level subject panel teams: Middle manager as Situational Knowledge Leaders establish grade-level teaching teams in which senior and novice teachers collaborate on SCT teaching plans for the same topics but with different levels of SCT expertise, it enables collaboration, mutual learning, and the development of collegial-trust. This environment facilitates the socialization of SCT knowledge.

5.2.4.2 Enabling Externalization of SCT Tacit Knowledge into Subject-Level Explicit Knowledge

The knowledge leadership practices and school organizational factors that enable the externalization process of tacit knowledge into subject-level explicit knowledge include:

1. To establish the middle managers' situational knowledge leadership: School middle managers as situational knowledge leaders facilitate the SCT knowledge creation process and promote the professional dialogue and collegial-trust that encourage teachers to share and then externalize their tacit knowledge into subject-level explicit knowledge by working together.
2. To promote the culture of reflective teaching: Middle managers as situational knowledge leaders can encourage reflective teaching among teachers, especially in post-lesson reviews, facilitates externalizing tacit knowledge into subject-level explicit knowledge.

3. To manage the Learning Circle: Middle managers as situational knowledge leaders can organize, manage and institutionalize SCT Learning Circle that enable teachers to externalize tacit knowledge into subject-level explicit knowledge through professional dialogue.
4. To establish the KM system of documentation: School centralized knowledge leaders can develop clear and concise documentation of subject-level SCT explicit knowledge captures the essence of externalized SCT tacit knowledge.

5.2.4.3 Facilitating the Combination of Group-Specific SCT Knowledge with School SCT Knowledge

School centralized knowledge leaders can effectively combine group-specific SCT knowledge into their overall knowledge base and IC through effective knowledge leadership practices and organizational factors.

1. To establish the centralized knowledge leadership: Principal, vice-principals, and PSMCD as centralized knowledge leaders should work together with middle managers, and teachers to promote a culture of knowledge sharing, encouraging combining group-specific SCT explicit knowledge into the school's SCT knowledge asset.
2. To encourage the cross-subject panel teams: Cross-subject panel teams, supervised by PSMCD, facilitate collaboration among teachers with diverse subject expertise. This collaboration allows them to combine their group-specific SCT explicit knowledge into

the school's overall SCT knowledge asset.

3. To establish an effective ICT system: Centralized knowledge leaders can establish an effective ICT system that aid in combining and disseminating group-specific SCT explicit knowledge into the school's overall SCT knowledge.
4. To establish KM systems: Centralized knowledge leaders can establish KM systems that capture, store, and share group-specific SCT explicit knowledge, which can be combined with other knowledge to form the school's overall SCT knowledge.

5.2.4.4 Fostering Internalization of SCT Explicit Knowledge into Tacit Knowledge

Effective knowledge leadership practices and school organizational factors that enable the internalization of SCT explicit knowledge into personal tacit knowledge include:

1. To establish teachers' distributed knowledge leadership: As distributed knowledge leaders, teachers can actively engage in the process of SCT lesson implementation and cultivate a culture of knowledge creation. This fosters the internalization of SCT explicit knowledge, allowing for the development of personal mastery of SCT tacit knowledge.
2. To provide ample learning opportunities: Centralized knowledge leaders can establish a comprehensive mentoring system that teaching mentors and senior teachers provide and engage into the hands-on learning and teacher learning opportunities for novice teachers to internalize SCT explicit knowledge into personal

tacit knowledge.

3. To promote the culture of reflective teaching: Middle managers as situational knowledge leaders can encourage reflective teaching among teachers, particularly in post-lesson reviews, fosters internalizing SCT explicit knowledge into personal SCT tacit knowledge through lesson implementation.
4. Centralized knowledge leaders need to foster knowledge sharing culture with mutual trust: A school culture that values mutual trust and sharing supports the internalization of SCT explicit knowledge into SCT tacit knowledge, promoting the application of SCT knowledge in classroom practice.

5.3 Research and Practical Implications

This study can contribute to the research of three-tiered school knowledge leadership and the practices of KM based on the research findings by providing a practical guide to school leaders.

5.3.1 Research Implications

In the context of public schools in HK, this study makes a unique contribution by investigating empirical impact of three-tiered knowledge leadership on teachers' SCT knowledge creation and transfer. This study expands knowledge leadership theory and practice by providing empirical evidence. Identifies how knowledge leadership influences knowledge sharing and avoiding knowledge hiding.

This study contributes to educational leadership literature by supporting the three-tiered knowledge leadership roles of principals, middle managers, and teachers, narrowing the knowledge gap. The findings of this study have implications for principals, middle managers, teachers, and related training programs. Additionally, the study's findings demonstrate that when the three-tiered knowledge leadership practices align with the three levels of PDCA cycles in the Learning Circle, it facilitates the SECI process. This finding is mentioned for the first time, to the best of our knowledge.

This qualitative study adds to the existing research on KM practices and the creation and transfer of SCT tacit knowledge. It investigates the relationship between knowledge leadership and school performance in SCT implementation using the SECI model. However, further quantitative exploration is needed to examine this relationship. The study highlights the need for systematic reflection on how SCT knowledge creation and transfer affect long-term school performance.

This research has important implications for future studies on knowledge leadership, focusing on three-tiered leadership practices and organizational factors that impact knowledge creation, transfer, and application.

5.3.2 Practical Implications

It is important for school management to establish a high collegial-trust environment.

Teachers who have positive feelings about their school are more likely to engage in other-

oriented tacit knowledge-sharing interactions, mutual knowledge creation, and individual-based PCK transfer. This is essential for the school's success as a knowledge-creating school. The practical implication of this study for school leaders, decision-makers, and practitioners is to foster school commitment by enhancing teachers' perceptions of KM and SCT, aligned with the school's knowledge vision and context. The school should be viewed as a knowledge-creating school.

This study indicates that in the face of shrinking classes, HK school leaders should prioritize building school commitment and teacher motivation by treating teachers with dignity and respect. Providing explanations for decisions and events that affect teachers is crucial, as suggested by Fassina et al. (2008).

This study has important implications for policymakers and practitioners in promoting teacher efficacy for effective SCT policy implementation in HK. KM is an effective mechanism for enhancing teachers', middle managers' and principal's instructional leadership by fostering three-tiered knowledge leadership at the instructional, curriculum, and school levels. The study highlights that the decrease in student enrollment can be viewed as an opportunity to implement SCT in secondary schools and improve the quality of education and address the learning gap by having smaller class sizes, rather than being seen as a crisis.

The SECI model can provide guidance for working tasks and teaching routines to implement SCT knowledge creation in schools. This can assist teachers, middle managers,

and principals in adapting, adopting, and systematizing knowledge creation for transfer to other instructional and administrative areas, institutionalizing it in the school context. The SECI framework can also facilitate the process of SCT knowledge acquisition, sharing, exchange, and creation within schools across departments and inter-school boundaries among groups of teachers.

5.3.3 Originality/value

This study offers insight into re-conceptualizing the meaning of KM and customizing its application in the school context.

The turbulent and competitive educational environment, coupled with a declining student population, has had a significant impact on HK schools. This study offers a list of viable actions and leadership practices to overcome barriers to internal SCT knowledge creation and transfer in the school context. The action list serves as a guide for school decision-making to address challenges related to various barriers in preparing, implementing, or improving SCT internal knowledge transfer practices.

5.4 Limitation of this Study

This study is subject to a few limitations that provide avenues for future research. A limitation of this study is its sample size, which only includes principals, middle managers, and teachers from two HK primary schools, making it challenging to generalize the findings to other schools.

Furthermore, the findings of this study may not be applicable to other countries since it is conducted in the HK context, which is facing a significant crisis of shrinking class sizes and declining student population.

This qualitative research has limited generalizability. Future large-scale quantitative research can be conducted, including secondary schools and other geographical areas, to produce more generalizable findings. However, this research is significant in providing a comprehensive description and illumination of three-tiered knowledge leadership practices and organizational factors that enhance knowledge creation, transfer, and application, which were previously unavailable in the HK context.

Finally, this study may have cultural limitations as it was conducted in the oriental cultural context, and the findings may only be applicable to the HK culture and work environment.

5.5 Future Directions

To delve deeper into three-tiered knowledge leadership in the school setting, future studies can explore the following directions.

Using qualitative techniques as the primary data collection method is a limitation of this study. Future studies should incorporate quantitative techniques to obtain more comprehensive data and results to achieve the study's goals and objectives. Surveys can be used in more schools as KM becomes more popular to test the generalizability of this study's

findings and determine if they are supported by quantitative data.

This research is limited as it was conducted in only two HK primary schools. To gain a more comprehensive understanding of three-tiered knowledge leadership practices, similar research should be conducted in secondary schools or in other locations or countries with different cultural contexts.

Farnese et al. (2019) suggest that the SECI model is useful for evaluating knowledge creation in school contexts by distinguishing between tacit and explicit knowledge. This study's findings suggest that the SECI framework provides a dynamic, ongoing, integrated, and systemic roadmap for knowledge creation that guides a practical SCT PCK creation process and manages the sequence of SCT instructional activities in school classrooms. The analysis indicates that the socialization stage is the most significant but least explored stage of knowledge creation, and the combination stage is not fully understood in the HK school context. Further empirical research is needed in this area.

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Appendix

Appendix one: Interview Protocol

1. Interview Guide and Questions for Principals

A. Context and background of the case school?

- Please offer a brief introduction of your school.
- What is KM in your school?
- How and what are the reasons for your school decide to implement KM? How to get it started?
- How KM is related to the school based SCT practices and the professional development activities respectively?

B. The effectiveness of the SCT knowledge sharing, creation, and transfer?

- What are the school's advantages in implementing SCT knowledge sharing, creation, and transfer? How to further improve it?
- What are the school's disadvantages in implementing SCT knowledge sharing, creation, and transfer? How to overcome it?
- To your understanding as a principal, to what extent do HK primary school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- To your understanding as a principal, to what extent do your school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- How and what are the reasons for this pedagogical change in SCT classes in your school if any?
- Would such instructional and pedagogical change necessarily lead to better implementation of SCT policy?
- As an instructional leader, do you think that the KM is a significant initiative for the effective implementation of SCT policy and the sustainable school development? Why?
- Can Nonaka's SECI knowledge creation model (1995) be used as an analytical lens to explain how the SCT tacit and explicit knowledge can be conversed and created in your school?
- As a principal, do you think that the SCT knowledge sharing, creation, and transfer matters in the individual, departmental and school level for the effective implementation of SCT policy? Why?
- What is the mechanism of the SCT knowledge sharing, creation, and transfer that can enhance your understanding as well as teachers' understanding on how to design teachers' professional learning programs that comply with Galton's six SCT principles in school's cultural context?

C. What are the knowledge leadership roles of principal, middle managers, and teachers in the process of SCT knowledge creation, transfer, and management practices?

- As a principal, what are the perceived roles of principal in the process of SCT knowledge sharing, creation, and transfer in local primary school?
- As a principal, what are the perceived roles of PSMCD, middle managers and teachers in the process of SCT knowledge sharing, creation, and transfer in local primary school?
- In your school, do you think principal; PSMCD, middle managers and teachers play any role as knowledge leaders? If yes, how, and why?
- Do you think the process of developing school's IC through SCT knowledge sharing, creation, and transfer matters in your school?
- How do you as a principal enact the SCT knowledge creation that enhance teachers' SCT pedagogical competency?
- How do your PSMCD, middle managers and teachers enact the SCT knowledge sharing, creation, and transfer that enhance teachers' SCT pedagogical competency?
- In your school, do you think PSMCD, middle managers and teachers act as designers and creators of SCT tacit and explicit knowledge? Why and how?
- How can the roles of principal and teachers as knowledge leaders better perform in the process of knowledge sharing, creation, and transfer in SCT policy context?

D. Enabling factors of SCT knowledge sharing, creation, and transfer?

- What are the enabling factors that affect the institutionalization of KM for the effective implementation of SCT in your schools?
- Do you think that knowledge leadership affects the SCT knowledge sharing, creation, transfer, and management practices? Who play the role and how?
- Do you think that school principal and teachers' role as knowledge leaders is a critical factor for the establishment of the KM in your school? Who play the role and how?
- What are the other important factors?
- How do these important factors relate to the role of principal, middle managers, and teachers' knowledge leadership in school context?

2. Interview Guide and Questions for PSMCD

A. Context and background of the case school?

- Please offer a brief introduction of your school.
- What is KM in your school?
- How and what are the reasons for your school decide to implement KM? How to get it started?

- How KM is related to the school based SCT practices and the professional development activities respectively?
- Does your school have any SCT manual? Why?

B. The effectiveness of the SCT knowledge sharing, creation, and transfer?

- What are the school's advantages in implementing SCT knowledge sharing, creation, and transfer? How to further improve it?
- What are the school's disadvantages in implementing SCT knowledge sharing, creation, and transfer? How to overcome it?
- To your understanding as a PSMCD, to what extent do HK primary school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- To your understanding as a PSMCD, to what extent do your school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- How and what are the reasons for this pedagogical change in SCT classes in your school if any?
- Would such instructional and pedagogical change necessarily lead to better implementation of SCT policy?
- As an instructional leader, do you think that the KM is a significant initiative for the effective implementation of SCT policy and the sustainable school development? Why?
- Can Nonaka's SECI knowledge creation model (1995) be used as an analytical lens to explain how the SCT tacit and explicit knowledge can be conversed and created in your school?
- As a PSMCD, do you think that the SCT knowledge sharing, creation, and transfer matters in the individual, departmental and school level for the effective implementation of SCT policy? Why?
- What is the mechanism of the SCT knowledge sharing, creation, and transfer that can enhance your understanding as well as teachers' understanding on how to design teachers' professional learning programs that comply with Galton's six SCT principles in school's cultural context?

C. What are the knowledge leadership roles of principal and teachers in the process of SCT knowledge creation, transfer, and management practices?

- As a PSMCD, what are the perceived roles of principal, PSMCD, middle managers and teachers in the process of SCT knowledge sharing, creation, and transfer in local primary school?
- In your school, do you think principals, PSMCD, middle managers and teachers play any role as knowledge leaders? If yes, how, and why?

- Do you think the process of developing school's IC through knowledge creation matters in your school?
- How do you as a PSMCD enact the SCT knowledge sharing, creation, and transfer that enhance teachers' SCT pedagogical competency?
- How do your principal, middle managers and teachers enact the SCT knowledge creation that enhance teachers' SCT pedagogical competency?
- In your school, do you think PSMCD, middle managers and teachers act as designers and creators of SCT tacit and explicit knowledge? Why and how?
- What are the leadership practices that facilitate the combination of group-specific SCT knowledge into school SCT knowledge?
- How can the roles of principal and teachers as knowledge leaders better perform in the process of knowledge sharing, creation, and transfer in SCT policy context?

D. Enabling factors of SCT knowledge sharing, creation, and transfer?

- What are the enabling factors that affect the institutionalization of KM for the effective implementation of SCT in your schools?
- Do you think that knowledge leadership affects the SCT knowledge sharing, creation, transfer, and management practices? Who play the role and how?
- Do you think that school principal, middle managers and teachers' role as knowledge leaders is a critical factor for the establishment of the KM in your school? Who play the role and how?
- What are the organizational factors that facilitate the combination of group-specific SCT knowledge into school SCT knowledge?
- What are the other important factors?
- How do these important factors relate to the role of principal, middle managers, and teachers' knowledge leadership in school context?

3. Interview Guide and Questions for middle managers including core subject panels

A. Context and background of the case school?

- Please offer a brief introduction of your school.
- What is KM in your school?
- How and what are the reasons for your school decide to implement KM? How to get it started?
- How KM is related to the school based SCT practices and the professional development activities respectively?
- Do your subject panel / administrative group have any SCT guideline? Why?

B. The effectiveness of the SCT knowledge sharing, creation, and transfer?

- What are the school's advantages in implementing SCT knowledge sharing, creation, and transfer? How to further improve it?
 - What are the school's disadvantages in implementing SCT knowledge sharing, creation, and transfer? How to overcome it?
 - To your understanding as a middle managers/ core subject panel, to what extent do your school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
 - How and what are the reasons for this pedagogical change in SCT classes in your school if any?
 - Would such instructional and pedagogical change necessarily lead to better implementation of SCT policy?
 - As an instructional leader, do you think that the KM is a significant initiative for the effective implementation of SCT policy and the sustainable school development? Why?
 - Can Nonaka's SECI knowledge creation model (1995) be used as an analytical lens to explain how the SCT tacit and explicit knowledge can be conversed and created in your school?
 - As a middle managers/ core subject panel, do you think that the SCT knowledge sharing, creation and transfer matters in the individual, departmental and school level for the effective implementation of SCT policy? Why?
 - What is the mechanism of the SCT knowledge sharing, creation and transfer that can enhance your understanding as well as teachers' understanding on how to design teachers' professional learning programs that comply with Galton's six SCT principles in school's cultural context?
- C. What are the knowledge leadership roles of principal, middle managers, and teachers in the process of knowledge creation, transfer, and management practices?**
- As a middle managers/ core subject panel, what are the perceived roles of principal, PSMCD, middle managers and teachers in the process of knowledge sharing, creation, and transfer in local primary school?
 - In your school, do you think principal; PSMCD, middle managers and teachers play any role as knowledge leaders? If yes, how, and why?
 - Do you think the process of developing school's IC through knowledge creation matters in your school?
 - How do you as a middle managers/ core subject panel enact the SCT knowledge sharing, creation and transfer that enhance teachers' SCT pedagogical competency?
 - How do your principal, PSMCD and teachers enact the SCT knowledge sharing, creation and transfer that enhance teachers' SCT pedagogical competency?
 - In your school, do you think PSMCD, middle managers and teachers act as designers and creators of SCT tacit and explicit knowledge? Why and how?

- How can the roles of principal, middle managers, and teachers as knowledge leaders better perform in the process of knowledge sharing, creation, and transfer in SCT policy context?
- What are the leadership practices that facilitate subject teachers to externalize their SCT tacit knowledge into subject level explicit knowledge?

D. Enabling factors of SCT knowledge sharing, creation, and transfer?

- What are the enabling factors that affect the institutionalization of KM for the effective implementation of SCT in your schools?
- Do you think that knowledge leadership affects the SCT knowledge sharing, creation, transfer, and management practices? Who play the role and how?
- Do you think that school principals and teachers' role as knowledge leaders is a critical factor for the establishment of the KM in your school? Who play the role and how?
- What are the organizational factors that facilitate subject teachers to externalize their SCT tacit knowledge into subject level explicit knowledge?
- What are the other important factors?
- How do these important factors relate to the role of principals and teachers' knowledge leadership in school context?

4. Interview Guide and Questions for Mentor teachers

A. The effectiveness of the SCT knowledge sharing, creation, and transfer?

- What are the school's advantages in implementing SCT knowledge sharing, creation, and transfer? How to further improve it?
- What are the school's disadvantages in implementing SCT knowledge sharing, creation, and transfer? How to overcome it?
- To your understanding as a teacher, to what extent do your school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- How and what are the reasons for this pedagogical change in SCT classes in your school if any?
- Would such instructional and pedagogical change necessarily lead to better implementation of SCT policy?
- As a mentor teacher, do you think that the KM is a significant initiative for the effective implementation of SCT policy and the sustainable school development? Why?
- Can Nonaka's SECI knowledge creation model (1995) be used as an analytical lens to explain how the SCT tacit and explicit knowledge can be conversed and created in your school?

- As a mentor teacher, do you think that the SCT knowledge sharing, creation and transfer matters in the individual, departmental and school level for the effective implementation of SCT policy? Why?
- What is the mechanism of the SCT knowledge sharing, creation and transfer that can enhance your understanding as well as teachers' understanding on how to design teachers' professional learning programs that comply with Galton's six SCT principles in school's cultural context?

B. What are the knowledge leadership roles of principal, middle managers, and teachers in the process of SCT knowledge creation, transfer, and management practices?

- As a mentor teacher, what are the perceived roles of principal, PSMCD, middle managers and teachers in the process of SCT knowledge sharing, creation, and transfer in local primary school?
- In your school, do you think principal; PSMCD, middle managers and teachers play any role as knowledge leaders? If yes, how, and why?
- Do you think the process of developing school's IC through knowledge creation matters in your school?
- How do you as a mentor teacher enact the SCT knowledge sharing, creation, and transfer that enhance teachers' SCT pedagogical competency?
- How do your principal, PSMCD and teachers enact the SCT knowledge sharing, creation and transfer that enhance teachers' SCT pedagogical competency?
- In your school, do you think PSMCD, middle managers, and teachers act as designers and creators of SCT tacit and explicit knowledge? Why and how?
- What are the leadership practices that enable you to share your SCT tacit knowledge with novice teachers?
- What are the leadership practices that enable novice teachers to internalize the SCT explicit knowledge into their tacit knowledge?
- How can the roles of principal, middle managers and teachers as knowledge leaders better perform in the process of SCT knowledge sharing, creation, and transfer in school context?

C. Enabling factors of SCT knowledge sharing, creation, and transfer?

- What are the enabling factors that affect the institutionalization of KM for the effective implementation of SCT in your schools?
- Do you think that knowledge leadership affects the SCT knowledge sharing, creation, transfer, and management practices? Who play the role and how?
- Do you think that school principal, middle managers, and teachers' role as knowledge

leaders is a critical factor for the establishment of the KM in your school? Who play the role and how? What are the leadership practices and organizational factors that enable the individual teachers to share their SCT tacit knowledge among individual teachers?

- What are organizational factors that enable you to share your SCT tacit knowledge with novice teachers?
- What are the organizational factors that enable novice teachers to internalize the SCT explicit knowledge into their tacit knowledge?
- What are the other important factors?
- How do these important factors relate to the role of principals, middle managers, and teachers' knowledge leadership in school context?

5. Interview Guide and Questions for novice teachers

A. The effectiveness of the SCT knowledge sharing, creation, and transfer?

- What are the school's advantages in implementing SCT knowledge sharing, creation, and transfer? How to further improve it?
- What are the school's disadvantages in implementing SCT knowledge sharing, creation, and transfer? How to overcome it?
- To your understanding as a novice teacher, to what extent do your school teachers adopt a SCT pedagogy that can fulfill Galton's six principles?
- How and what are the reasons for this pedagogical change in SCT classes in your school if any?
- Would such instructional and pedagogical change necessarily lead to better implementation of SCT policy?
- As a novice teacher, do you think that the KM is a significant initiative for the effective implementation of SCT policy and the sustainable school development? Why?
- Can Nonaka's SECI knowledge creation model (1995) be used as an analytical lens to explain how the SCT tacit and explicit knowledge can be conversed and created in your school?
- As a novice teacher, do you think that the SCT knowledge sharing, creation and transfer matters in the individual, departmental and school level for the effective implementation of SCT policy? Why?
- What is the mechanism of the SCT knowledge sharing, creation, and transfer that can enhance your understanding as well as teachers' understanding on how to design teachers' professional learning programs that comply with Galton's six SCT principles in school's cultural context?

B. What are the knowledge leadership roles of principal, middle managers, and teachers in the process of SCT knowledge sharing, creation, transfer, and

management practices?

- As a novice teacher, what are the perceived roles of principal, PSMCD, middle managers and teachers in the process of SCT knowledge sharing, creation, and transfer in local primary school?
- In your school, do you think principals, PSMCD, middle managers and teachers play any role as knowledge leaders? If yes, how, and why?
- Do you think the process of developing school's IC through knowledge creation matters in your school?
- How do you as a novice teacher enact the SCT knowledge sharing, creation and transfer that enhance teachers' SCT pedagogical competency?
- How do your principal, PSMCD and teachers enact the SCT knowledge sharing, creation and transfer that enhance teachers' SCT pedagogical competency?
- In your school, do you think PSMCD, middle managers and teachers act as designers and creators of SCT tacit and explicit knowledge? Why and how?
- What are the leadership practices that enable the mentor teachers to share their SCT tacit knowledge with you?
- What are the leadership practices that enable you to internalize the SCT explicit knowledge into their tacit knowledge?
- How can the roles of principal, middle managers, and teachers as knowledge leaders better perform in the process of knowledge sharing, creation, and transfer in SCT policy context?

C. Enabling factors of SCT knowledge sharing, creation, and transfer?

- What are the enabling factors that affect the institutionalization of KM for the effective implementation of SCT in your schools?
- Do you think that knowledge leadership affects the SCT knowledge sharing, creation, transfer, and management practices? Who play the role and how?
- Do you think that school principals, middle managers, and teachers' role as knowledge leaders is a critical factor for the establishment of the KM in your school? Who play the role and how?
- What are the organizational factors that enable the mentor teachers to share their SCT tacit knowledge with you?
- What are the organizational factors that enable you to internalize the SCT explicit knowledge into their tacit knowledge?
- What are the other important factors?
- How do these important factors relate to the role of principal and teachers' knowledge leadership in school context?

Appendix two: Lesson Observation and Teacher Appraisal Form of Y School (in Chinese)

Y School 2022 至 2023 年度 觀課表 (科長觀課及考績觀課)

授課老師：_____

觀課者：_____

觀課日期：_____

觀課時間：_____

科目：_____

班別：_____

教學語言： 廣東話 英語 普通話 其他：_____ 配合學校教學語言政策： 是 否

核心元素	觀察重點	課堂上可觀察到之項目 (在恰當的□內打✓)
專業知識	<ul style="list-style-type: none"> 老師具備專業的科本知識 	<input type="checkbox"/> 學科知識良好 <input type="checkbox"/> 概念清晰 其他：_____
學習目標	<ul style="list-style-type: none"> 學習目標明確，並清楚讓學生知道 	<input type="checkbox"/> 目標切合學生學習需要 <input type="checkbox"/> 目標切合學生學習能力 其他：_____
有效提問	<ul style="list-style-type: none"> 多提問 問題涵蓋不同層次：記憶、理解、應用、分析、評鑑、創造 	<input type="checkbox"/> 有效引導 <input type="checkbox"/> 有效追問 <input type="checkbox"/> 思考作答時間足夠 <input type="checkbox"/> 問題能引發思考 <input type="checkbox"/> 能利用不同層次提問照顧學生學習多樣性 其他：_____
學生參與	<ul style="list-style-type: none"> 學生已建立良好的學習常規 學習活動能提升學生的參與度 學習活動能讓師生或生生間有良好的互動機會 	<input type="checkbox"/> 學生有興趣 <input type="checkbox"/> 學生有自信 <input type="checkbox"/> 學生有持續的學習動機 <input type="checkbox"/> 師生關係良好 其他：_____

課堂管理	<ul style="list-style-type: none"> ● 課室秩序井然 ● 老師能有效處理不當行為 	<input type="checkbox"/> 已建立課室常規 <input type="checkbox"/> 能營造安全/有助益的學習環境 其他: _____ _____
有效回饋	<ul style="list-style-type: none"> ● 能提供機會讓學生展示所學 ● 有鞏固及延伸學習的安排 ● 有總結學生表現 	<input type="checkbox"/> 回饋具體 <input type="checkbox"/> 回饋能有助學生作出改善 <input type="checkbox"/> 回饋能有助學生學習 其他: _____ _____
促進學習的評估	<ul style="list-style-type: none"> ● 讓學生總結課堂所學 ● 有自評/互評 ● 有課堂上的評估活動 	<input type="checkbox"/> 能監察學生的學習進展 其他: _____ _____
學生學習表現	<ul style="list-style-type: none"> ● 學生能建構正確的概念 ● 學生能運用所學的知識及技能 	<input type="checkbox"/> 能達至所定的學習目標 其他: _____ _____

學與教主要優點	學與教可改善的地方

觀課者簽署: _____

授課老師簽署: _____

日期: _____

日期: _____

Appendix three Lesson Observation Record of X School

(Part 1 : from 0:05 –0:10) Name of the X School teacher:X10

Class: 6C Subject: Chinese Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 35 mins Date: 26/11/2020 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓			✓	✓		✓	70%
2. Teacher talks/listens to class (boy pupil in focus)					✓	✓					20%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above									✓		10%

(Part 2 : from 0:15 – 0:20) Name of the X School teacher : X10

Class: _____ Subject: Chinese Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 35 mins Date: _____ ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓	✓	✓		✓	✓	✓	90%
2. Teacher talks/listens to class (boy pupil in focus)							✓				10%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 3 : from 0:25 –0:30) Name of the X School teacher :X10

Class:_____ Subject: Chinese Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 26/11/2020 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓		✓	✓	✓	✓	✓	✓	✓	✓	90%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)		✓									10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Overall) Name of the X School teacher :X10

Class:_____ Subject: Chinese Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 26/11/2020 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											84%
2. Teacher talks/listens to class (boy pupil in focus)											10%
3. Teacher talks/listens to class (girl pupil in focus)											3%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											3%



Lesson Observation Record of X School

(Part 1 : from 0:05 –0:10) Name of the X School teacher :X3

Class: 4A Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 16/11/2021 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓	✓		✓	✓	✓	✓	90%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)						✓					10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Part 2 : from 0:15 – 0:20) Name of the X School teacher :X3

Class: 4A Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: _____ ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓			✓		✓		60%
2. Teacher talks/listens to class (boy pupil in focus)								✓		✓	20%
3. Teacher talks/listens to class (girl pupil in focus)					✓	✓					20%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 3 : from 0:25 –0:30) Name of the X School teacher :X3

Class: 4A Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 16/11/2021 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓		✓		✓	✓	✓		✓	70%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)			✓		✓				✓		30%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Overall) Name of the X School teacher :X3

Class: 4A Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date 16/11/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											73%
2. Teacher talks/listens to class (boy pupil in focus)											7%
3. Teacher talks/listens to class (girl pupil in focus)											20%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 1 : from 0:05 –0:10) Name of the X School teacher :X12

Class: 6C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 2/11/2021 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓	✓	✓	✓		✓	✓	90%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)								✓			10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Part 2 : from 0:15. – 0:20) Name of the X School teacher :X12

Class: 6C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 2/11/2021 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)		✓	✓	✓	✓	✓		✓	✓	✓	80%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)	✓						✓				20%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 3 : from 0:25 –0:30) Name of the X School teacher :X12

Class: 6C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 2/11/2021 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓	✓	✓	✓	✓	✓	✓	✓		90%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)										✓	10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Overall) Name of the X School teacher :X12

Class: 6C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 2/11/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											87%
2. Teacher talks/listens to class (boy pupil in focus)											0%
3. Teacher talks/listens to class (girl pupil in focus)											13%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 1 : from 0:05 –0:10) Name of the X School teacher :X9

Class: 4A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 13/12/2019 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓			✓			✓	✓	✓	60%
2. Teacher talks/listens to class (boy pupil in focus)			✓	✓		✓	✓				40%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Part 2 : from 0:15. – 0:20) Name of the X School teacher :X9

Class: 4A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 13/12/2019 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)			✓	✓		✓		✓	✓	✓	60%
2. Teacher talks/listens to class (boy pupil in focus)	✓	✓			✓		✓				40%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

Lesson Observation Record of X School

(Part 3 : from 0:25 –0:30) Name of the X School teacher :X9

Class: 4A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 13/12/2019 ✓

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)		✓					✓	✓	✓	✓	50%
2. Teacher talks/listens to class (boy pupil in focus)	✓		✓	✓							30%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above					✓	✓					20%

(Overall) Name of the X School teacher :X9

Class: 4A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 35 mins Date: 13/12/2019 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											57%
2. Teacher talks/listens to class (boy pupil in focus)											37%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											6%

(Overall) 4 Teachers of X School

Class: __ Subject: _ Module: _____ Unit/Topic: _____

No. of Periods/ Duration: Date: Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											75.3%
2. Teacher talks/listens to class (boy pupil in focus)											13.5%
3. Teacher talks/listens to class (girl pupil in focus)											9%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											2.2%

(Overall) Novice Teachers X10 + X12

Class: 4A Subject: English Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 35 mins Date 16/11/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											85.5%
2. Teacher talks/listens to class (boy pupil in focus)											5%
3. Teacher talks/listens to class (girl pupil in focus)											8%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											1.5%

(Overall) Experience Teachers X3+ X9

Class:___ Subject:_ Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 35 mins Date1 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											65%
2. Teacher talks/listens to class (boy pupil in focus)											22%
3. Teacher talks/listens to class (girl pupil in focus)											10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											3%

Appendix four Lesson Observation Record of Y School

(Part 1: from 0:05 –0:10) Name of the Y School teacher: Y10

Class: 3D Subject: Chinese Module: _____ Unit/Topic: _____ ✓

No. of Periods/ Duration: single period 40 mins Date: 27/04/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
2. Teacher talks to class (no pupil in focus)						✓				✓	20%
3. Teacher talks/listens to class (boy pupil in focus)		✓	✓		✓		✓				40%
4. Teacher talks/listens to class (girl pupil in focus)	✓			✓				✓	✓		40%
5. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Part 2 : from 0:18 – 0:23) Name of the Y School teacher: Y10

Class: 3D Subject: Chinese Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 40 mins Date: 27/04/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)							✓	✓			20%
2. Teacher talks/listens to class (boy pupil in focus)	✓		✓			✓					30%
3. Teacher talks/listens to class (girl pupil in focus)		✓		✓	✓					✓	40%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above									✓		10%

Lesson Observation Record of Y School

(Part 3 : from 0:30 –0:35) Name of the Y School teacher:Y10

Class: 3D Subject: Chinese Module: _____ Unit/Topic: _____ ✓No. of Periods/ Duration: single period 40 mins Date: 27/04/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)								✓	✓		20%
2. Teacher talks/listens to class (boy pupil in focus)		✓		✓		✓					30%
3. Teacher talks/listens to class (girl pupil in focus)	✓		✓							✓	30%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above					✓		✓				20%

(Overall) Name of the Y School teacher:Y10

Class: 3D Subject: Chinese Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 27/04/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											20%
2. Teacher talks/listens to class (boy pupil in focus)											33%
3. Teacher talks/listens to class (girl pupil in focus)											37%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											10%

Lesson Observation Record of Y School

(Part 1 : from 0:05 –0:10) Name of the Y School teacher:Y11

Class: 6D Subject: English Module: _____ Unit/Topic: _____✓No. of Periods/ Duration: single period 40 mins Date: 16/12/2019

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)		✓				✓					20%
2. Teacher talks/listens to class (boy pupil in focus)				✓						✓	20%
3. Teacher talks/listens to class (girl pupil in focus)			✓		✓				✓		30%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above	✓						✓	✓			30%

(Part 2 : from 0:18 – 0:23) Name of the Y School teacher:Y11

Class: 6D Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 16/12/2019

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)					✓				✓	✓	30%
2. Teacher talks/listens to class (boy pupil in focus)	✓						✓	✓			30%
3. Teacher talks/listens to class (girl pupil in focus)		✓	✓	✓							30%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above						✓					10%

Lesson Observation Record of Y School

(Part 3 : from 0:30 –0:35) Name of the Y School teacher:Y11

Class: 6D Subject: English Module: _____ Unit/Topic: _____ ✓No. of Periods/ Duration: single period 40 mins Date: 16/12/2019

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)						✓				✓	20%
2. Teacher talks/listens to class (boy pupil in focus)		✓	✓		✓		✓				410%
3. Teacher talks/listens to class (girl pupil in focus)	✓			✓				✓	✓		40%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above											0%

(Overall) Name of the Y School teacher: Y11

Class: 6D Subject: English Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 16/12/2019 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											27%
2. Teacher talks/listens to class (boy pupil in focus)											27%
3. Teacher talks/listens to class (girl pupil in focus)											27%
4. Teacher talks/listens to class (same pupil in focus)											6%
5. None of the above											3%

Lesson Observation Record of Y School

(Part 1 : from 0:05 –0:10) Name of the Y School teacher:Y12

Class: 5C Subject: Math Module: _____ Unit/Topic: _____ ✓No. of Periods/ Duration: single period 40 mins Date: 18/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)		✓	✓	✓	✓	✓	✓				60%
2. Teacher talks/listens to class (boy pupil in focus)	✓								✓		20%
3. Teacher talks/listens to class (girl pupil in focus)											0%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above								✓		✓	20%

(Part 2 : from 0:18 – 0:23) Name of the Y School teacher:Y12

Class: 5C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 18/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)			✓								10%
2. Teacher talks/listens to class (boy pupil in focus)		✓		✓	✓	✓	✓		✓		60%
3. Teacher talks/listens to class (girl pupil in focus)										✓	10%
4. Teacher talks/listens to class (same pupil in focus)								✓			10%
5. None of the above	✓										10%

Lesson Observation Record of Y School

(Part 3 : from 0:30 –0:35) Name of the Y School teacher:Y12

Class: 5C Subject: Math Module: _____ Unit/Topic: _____ ✓No. of Periods/ Duration: single period 40 mins Date: 18/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)			✓	✓					✓		30%
2. Teacher talks/listens to class (boy pupil in focus)	✓	✓			✓						30%
3. Teacher talks/listens to class (girl pupil in focus)							✓				10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above						✓		✓		✓	30%

(Overall) Name of the Y School teacher:Y12

Class: 5C Subject: Math Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 18/03/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											33%
2. Teacher talks/listens to class (boy pupil in focus)											37%
3. Teacher talks/listens to class (girl pupil in focus)											7%
4. Teacher talks/listens to class (same pupil in focus)											3%
5. None of the above											20%

Lesson Observation Record of Y School

(Part 1: from 0:05 –0:10) Name of the Y School teacher: Y13

Class: 5A Subject: GS Module: _____ Unit/Topic: _____ ✓No. of Periods/ Duration: single period 40 mins Date: 01/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)				✓			✓			✓	30%
2. Teacher talks/listens to class (boy pupil in focus)	✓		✓		✓			✓			40%
3. Teacher talks/listens to class (girl pupil in focus)		✓									10%
4. Teacher talks/listens to class (same pupil in focus)						✓			✓		20%
5. None of the above											0%

(Part 2 : from 0:18 – 0:23) Name of the Y School teacher: Y13

Class: 5A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 01/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)	✓	✓								✓	30%
2. Teacher talks/listens to class (boy pupil in focus)			✓	✓		✓	✓				40%
3. Teacher talks/listens to class (girl pupil in focus)					✓				✓		20%
4. Teacher talks/listens to class (same pupil in focus)								✓			10%
5. None of the above											0%

Lesson Observation Record of Y School

(Part 3 : from 0:30 –0:35) Name of the Y School teacher: Y13

Class: 5A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 01/03/2021

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)		✓		✓		✓			✓		40%
2. Teacher talks/listens to class (boy pupil in focus)			✓		✓			✓		✓	40%
3. Teacher talks/listens to class (girl pupil in focus)							✓				10%
4. Teacher talks/listens to class (same pupil in focus)											0%
5. None of the above	✓										10%

(Overall) Name of the Y School teacher: Y13

Class: 5A Subject: GS Module: _____ Unit/Topic: _____No. of Periods/ Duration: single period 40 mins Date: 01/03/2021 Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											33%
2. Teacher talks/listens to class (boy pupil in focus)											40%
3. Teacher talks/listens to class (girl pupil in focus)											13%
4. Teacher talks/listens to class (same pupil in focus)											10%
5. None of the above											4%

(Overall) 4 Novice Teachers

Class: _ _ Subject: _ Module: _____ Unit/Topic: _____

No. of Periods/ Duration: single period 40 mins Date: _ Every 30 second interval

Category of teacher behaviour	1	2	3	4	5	6	7	8	9	10	%
1. Teacher talks to class (no pupil in focus)											28%
2. Teacher talks/listens to class (boy pupil in focus)											36%
3. Teacher talks/listens to class (girl pupil in focus)											21%
4. Teacher talks/listens to class (same pupil in focus)											5%
5. None of the above											10%

Appendix five:

Unit Lesson Plan for Learning Circle Collegial Lesson Observation for primary 6 of Y School (in Chinese)

Y 學校

2020-2021 年度下學期學習圈觀課教案

教師：羅、張、勞、宇

科目：中文

日期：14/4/2021-15/4/2021

課題：《哪吒鬧東海》

班別：六年級

時間：2 教節(80 分鐘)

總教學目標:

1. 理清文章脈絡，簡述故事內容。
2. 閱讀文本，找出事例，概括人物性格。
3. 找出神話的特點在本文中的體現。

課前準備：

1. 學生對本課課文內容和字詞已有初步的理解。
2. 學生完成預習。

第一教節		
時間	教學流程	備註
22"	-自學提示一: 1.自由朗讀課文，邊讀邊圈出文中出現的人物的名字。 2.試概括:在哪吒身上到底發生了一件什麼事?說說這件事情的起因、經過、結果。試簡單地畫一畫腦圖。 (哪吒為什麼鬧海?他如何鬧海?結果怎麼樣?) 3.教師出示課文大意的腦圖，引導學生劃分故事的開始、發展、高潮和結局。 4.教師引導學生概括課文結構。小結:學生利用腦圖複述故事。	簡報
15"	-自學提示二: 1.哪吒鬧東海，東海龍王有何反應?用圈畫批註法在文中畫出相關句子。 2.由此可見，龍王的性格怎樣? 3.哪吒鬧東海，東海龍王有何反應?由此可見龍王的性格怎樣? 小結:東海龍王性格特點(ppt)	簡報
3"	-總結本堂所學: 1.本文的故事概述 2.本文的故事結構 3.分析了東海龍王的性格	
第二教節		
20"	自學提示一:1.用直線畫下能反映哪吒性格的語句，然後概括哪吒的性格特質，並說出原因。總結人物性格:	課本簡報

	<p>1. 哪吒: 見義勇為、有仁愛之心、勇敢、心高氣傲/嫉惡如仇</p> <p>2. 東海龍王: 欺善怕惡</p> <p>3. 巡海夜叉: 兇惡無禮、容易動怒、衝動</p> <p>4. 三太子: 目中無人、衝動</p>	
12"	<p>認識神話的特點:</p> <p>--神話是具幻想色彩的虛構故事或傳說。</p> <p>--古人因為不能用科學和客觀的角度解釋各種自然或社會現象，於是通過 幻想，加上主觀願望，把種種狀況擬人化，創造出充滿想像，內容誇張的神話。</p> <p>--古人常把主觀願望、各種美麗的嚮往寄寓在神話裏，神話中往往出現一些形象鮮明，能力不凡的英雄人物，他們能消除災難或對抗邪惡勢力，為 人們謀求幸福。</p> <p>課文怎樣符合神話的特點？試舉例說明。</p> <p>從文中找出證據，印證神話的特點:</p> <p>1. 超乎現實的想像，內容誇張 (文中哪個情節讓你感到神話超乎現實，加入了幻想?)</p> <p>2. 主角形象鮮明，能力不凡 (這個故事中，哪吒有何性格特質? 有何不凡之處?)</p> <p>3. 古代人民對世界起源、自然現象及社會生活的原始理解 (這個神話故事背後體現了當時的人類思考探索甚麼?)</p>	課本簡報
8"	<p>-概括本文主旨</p> <p>-問卷調查</p> <p>總結：回憶所學</p> <p>1. 能根據人物行為及故事情節以分析人物的性格。</p> <p>2. 能概括故事情節的特點，從而認識神話的特點。</p>	簡報問卷
	<p>延伸閱讀：哪吒故事知多少?</p> <p>-哪吒大戰母夜叉(乾坤圈)</p> <p>-哪吒大戰三太子(混天綾)</p> <p>任務:</p> <p>1. 分析人物性格</p> <p>2. 內容是否符合神話的特點</p> <p>-超乎現實的想像，內容誇張</p> <p>-主角形象鮮明，能力不凡</p> <p>-古代人民對世界起源、自然現象及社會生活的原始理解</p>	電子圖書
各班反思:		
6A (第	1. 學生的基礎穩固，十分熟悉故事的結構(開始、發展、高潮、結局)。	

一教節)	<p>2. 教師宜給予學生簡述故事的準則，讓學生能自評及互評，以了解自己的學習進程。</p> <p>3. 學生簡述故事後，教師宜作出引導，讓學生評價自己的表現，同時引導同學對他的表現作出評價。</p> <p>4. 教師應提供更多機會給學生朗讀人物對話，透過朗讀人物對話，學生更能體會人物的性格、故事的情節及緊張之處，那麼學生對故事的興趣及理解會更加深入。</p>	
6B (第二教節)	<p>1. 教師引導學生運用腦圖複述故事，之後學生有自評，教師再讓其他學生互評，以提升學習效能。</p> <p>2. 學生分析人物性格環節，教師接納學生不同的答案，亦有追問原因，此舉能擴闊全班的視野。</p> <p>3. 運用朗讀對話，讓學生更掌握人物性格。</p> <p>4. 如果是實體課，教師可即時把學生的答案(事前未有預備)板書黑板，讓學生清楚明白，但在 ZOOM 課，這種方法尚待探索。</p>	
6C (第一教節)	<p>1. 佈置腦圖預習，先讓學生對情節作思考，能讓學生在課前作思考。</p> <p>2. 加入了問卷調查以檢視學生對課文的熟悉程度，學生參與度高，根據檢視發現大部分學生能根據要求進行預習，個別同學對課文不熟悉，學生在此節的參與度高。</p> <p>3. 在教學設計方面，可在 C 班作拔尖的調整，如加入高階問題的小組網上討論作匯報的環節，以提升學生的學習。</p> <p>4. 在教學的設計方面，可在細讀文句方面作加強，以幫助稍弱的同學透過文句的深入朗讀體會人物的性格特點。</p> <p>5. 反思如何帶領學生由神話的想像的趣味性入手，讓學生對閱讀神話產生興趣。學生分享有趣味的情節，再探討作者的這樣鋪設的深意；或以新的篇章以引領思維作閱讀，結何創意的想像，也是一個可參考的方法。</p>	
6D (第二教節)	<p>1. 課前佈置熟讀課文和畫腦圖，以利於學生初步掌握故事內容。並在課堂中說故事，給學生互評，然後在此基礎上說出自己對故事的演繹，提高學生學習興趣。</p> <p>2. 佈置分述人物個性，應讓學生明確學習範圍，以免個別同學不明確。</p> <p>3. 大部分同學能在課文中找到描述人物个性的事例，但概括人物个性形容詞缺乏。教師在課堂上需多做引導，以提升學習效果。</p> <p>4. 要求學生朗讀描述事例句子，可幫助能力較弱的同學理解。</p> <p>5. 教學時間安排不夠理想，反思：可安排能力較高的同學多一個學習任務。</p>	

Appendix six:

The novice Math teacher's (Y12) sharing PowerPoints in the cross-departmental meeting on how to enhance student learning on the lesson of origami pattern for a cube (in Chinese)

1

正方體的摺紙圖樣



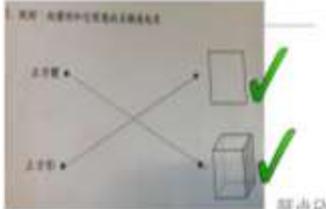
2

學習目標

- 找出所有正方體的摺紙圖樣
- 把正方體的摺紙圖樣按特徵分類
- 分辨可以摺成正方體的摺紙圖樣

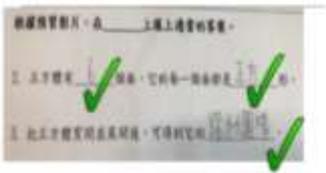
3

預習工



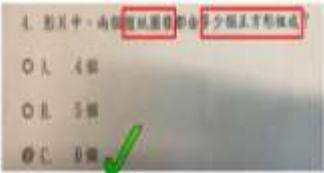
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預習工



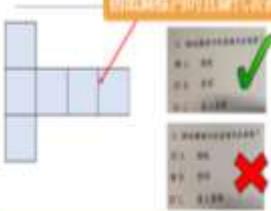
5

預習工



6

預習工



7

好奇一問

為心中好奇問一問：
為甚麼有6個面就是正方體？

請在影片最後寫下你想知道更多的問題。

李欣志

8

好奇一問

請在影片最後寫下你想知道更多的問題。

黃哲堯

楊梓晴

9

好奇一問

請在影片最後寫下你想知道更多的問題。

陳皓謙

鍾凱彤

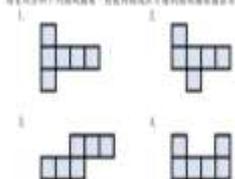
潘楷卓

10

活動： 拼砌正方體



11



12

分組活動

	A同學 (近門口)	B同學 (近窗戶)
第一回合	動手做 1-2題	觀察 檢視
第二回合	觀察 檢視	動手做 3-4題

限時兩分鐘!

	A同學 (近門口)	B同學 (近窗戶)
第一回合	動手做 1-2題	觀察 檢視
第二回合	觀察 檢視	動手做 3-4題

請同學留意下列中心
及下列圖形 每圖均包含1個紅色及1個藍色

姓名: _____ 日期: _____ 星期: _____

請將下列圖形剪下，並按圖上指示拼成一個立方體。

13

14

15

請同學留意下列中心
及下列圖形 每圖均包含1個綠色

姓名: _____ 日期: _____ 星期: _____

請將下列圖形剪下，並按圖上指示拼成一個立方體。

請同學留意下列中心
及下列圖形 每圖均包含1個藍色

姓名: _____ 日期: _____ 星期: _____

請將下列圖形剪下，並按圖上指示拼成一個立方體。

請同學留意下列中心
及下列圖形 每圖均包含1個紅色

姓名: _____ 日期: _____ 星期: _____

請將下列圖形剪下，並按圖上指示拼成一個立方體。

16

17

18

問題:

正方體的摺紙圖樣
第一型: 142

正方體的摺紙圖樣
第二型: 132

19

20

21

正方體的摺紙圖樣
第三型: 222 第四型: 33

活動:
考考你

考考你

問題一: 這些摺紙圖樣能摺成正方體?

可以的, 舉例綠色摺紙

不可以的, 舉例紅色摺紙

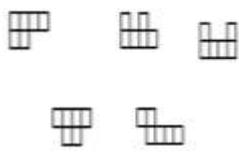
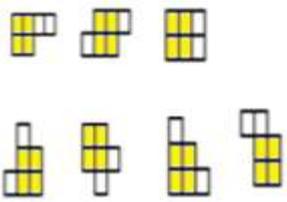
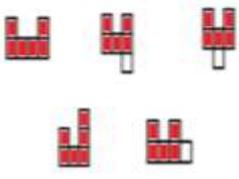
問題二: 它是哪一型?

22

23

24

<p>1. _____</p> <p>1 3 2</p> <p>✓</p> <p>25</p>	<p>2. _____</p> <p>1 4 1</p> <p>✓</p> <p>26</p>	<p>3. _____</p> <p>1 5</p> <p>✗</p> <p>27</p>
<p>4. _____</p> <p>3 3</p> <p>✓</p> <p>28</p>	<p>5. _____</p> <p>五字體 紅線裏只有5個面</p> <p>✗</p> <p>29</p>	<p>7. _____</p> <p>2 2 2</p> <p>✓</p> <p>30</p>
<p>8. _____</p> <p>1 3 2</p> <p>✓</p> <p>31</p>	<p>9. _____</p> <p>3 1 2</p> <p>✗</p> <p>32</p>	<p>6. _____</p> <p>3 3</p> <p>田字形</p> <p>✗</p> <p>33</p>
<p>10. _____</p> <p>1 3 2</p> <p>U字形</p> <p>✗</p> <p>34</p>	<p>延伸</p> <p>不能圍成正方體的網紙圖樣也有一定的特徵！</p> <p>NO</p> <p>35</p>	<p>六連/五連</p> <p>36</p>

<p>四連單邊</p> 	<p>田字型</p> 	<p>U字型</p> 
37	38	39
<p>九型</p> 	<p>課堂分享已經完結， 進行跨科專業對話。</p>	<p>如何將相關知識技巧， 遷移應用至您的科目？</p>
40	41	42

Appendix seven:

Guideline for Learning Circle of Y School (in Chinese)

「學習圈」指引

(一) → 目的

「學習圈」是教師專業交流和互相學習的重要平台。因此，校方希望藉著「學習圈」達到以下目標：

- → 建構知識，有系統地擴散，增強實踐知識在學校的流動，建立專業的學習社群。
- → 讓教師集中討論實際課堂的教學，以學生在課堂內外學習所提供的回饋為顯證，作出反思和改進。在這個過程中獲得的經驗和知識，有助教師作為下一步行動和決策的基礎。
- → 提供了一個互動、導動和發展的情境，促進專業對話，建立互相協作及相互依存的文化。
- → 提供一個課程發展平台，試行新的課程組織、教學策略、評估模式等，令老師的教學持續改進。

(二) → 「共同備課/學習圈」的元素

- → 反思先前設計對學與教的成效：進度表？設計單元？進展性評估/總結性評估？
- → 集體構思新課程的學習目標：留意甚麼？預定進度？空間？學抑或教？
- → 訂定內容、教、學與評估的策略：用甚麼教學材料？學習活動？工作紙？

(三) → 「共同備課/學習圈」的提醒

- → 老師是備課程，不是備課文；是研討，不是分工；是質素的提升，不是流程的考慮。
- → 老師備課前，各人帶著自己的意見，在備課時，再作互動。

(四) 「共同備課/學習圈」焦點內容：

1. 核心備課問題：進度表
 - 我們會否參照中央課程來訂定校本課程重點？
 - 我們有否就學校的需要分析教科書的適用性？
 - 我們有否就校本課程的要求而在教學材料方面作出增刪？
 - 我們在教學進度表或教學大綱預留空間以便在有需要時作出彈性的調節？
2. 核心備課問題：單元設計
 - 學生的表現能否達到備課會的預期目標？
 - 為什麼會有這樣的表現？
 - 這些發現會否在新的學習單元作出適當的跟進？
 - 備課會有否訂出學習成果和學習內容的焦點？
 - 有否審視及分析不同教學材料的適當性？
 - 學與教策略與預期學習成果能否配合？
 - 評估方式與學生的學習經驗是否配合？
3. 核心備課問題：評估
 - 測考卷或評估活動的內容是否配合平時所教所學？
 - 有否透過測考工具聚焦地去評估自己的教學？
 - 評估卷或評估活動有沒有清楚的評估重點？
 - 除了給予分數之外，評估有否反映學生的多元表現？
 - 評估後，有否分析及找出學生的強項或學習困難的地方？
 - 有否利用評估所得的發現改善將來的教學？

(五) 形式：

1. 以級為單位建構「共同備課/學習圈」
2. 如同事涉及的兩級皆是兩個學習圈，該同事會主力預備其中一個學習圈的教學資源，在另一個學習圈中該同事則以「共同備課」的角色參與學習圈的運作。
3. 如有同事未能編入學習圈，則該同事在共備中作備課，每學期需開放一節的課堂予同級的同事作觀課。(觀課的要求與學習圈一樣，需預備教案，至少有一位同事進行觀課。)
4. 如同事任教的科目皆為術科，未能參與學習圈的專業成長，其學與教的提升會由科長協助及跟進。
5. 各研究課的教學資源(一份)及觀課表由級連絡收集後教科長。

(六) 「共同備課/學習圈」科目組別：

年級	中	英	數
一年級	共同備課	學習圈	共同備課
		P1NET 共備	
二年級	共同備課	學習圈	共同備課
		P2NET 共備	
三年級	學習圈	共同備課	學習圈
		P3NET 共備	
四年級	學習圈	學習圈	學習圈
		P4-6 NET 共備	
五年級	學習圈	共同備課	學習圈
		P4-6 NET 共備	
六年級	學習圈	共同備課	學習圈
		P4-6 NET 共備	

具體名單如下：

中文：

P1 共備	P2 共備	P3 學習圈	P4 學習圈	P5 學習圈	P6 學習圈
*敏 ^① 儀蘇	*慧秀倩寶	*陳敏倩秀	*儀蓓張林	*欣映慧瑞	*勞蘇秋宇羅雪

英文：

P1 學習圈	P2 學習圈	P3 共備	P4 學習圈	P5 共備	P6 共備
*雅薇佑龔	*艷于施(鳳)	*嘉薇霽香	*鳳嘉霽(佑)	* ^② 龔雅 ^③	* ^④ 于艷施 ^⑤
P1NET 共備	P2NET 共備	P3NET 共備	P4-6NET 共備		
*雅薇佑龔 +V+R+Salma	*艷于施鳳 +V+R+Sandy	*嘉薇霽香 +V+R+Sandy	*鳳嘉霽佑 +V	*龔雅 ^② 廊 +R	香于艷施楊 +V+R

數學：

P1 共備	P2 共備	P3 共備	P4 學習圈	P5 學習圈	P6 學習圈
* ^⑥ 楚廊龔	*葉轉荃美	*淑睿 ^⑦ ^⑧	*轉珞婷鄧	*明基睿淑	*荃高葉楚梁

備註:

1. 打*者為級聯絡，(具體工作見「學習圈/共備」工作指引)
2. 打()者在該級的學習圈中以共備的角色參與。
3. 在共備中打○者每學期需開放一次課堂予同級同事觀課。

(七) **全日制**「共同備課/學習圈」的日期及時間:

1. **全日制**共同備課: 每週星期五下午 2:30-4:30。(中:P1, P2, 南亞共備;
英:P3, P6, P. 4-6NET 共備 數:P1, P2, P3)

時間(室別)	中(408)	英(407)	數(404)
下午 2:30-3:20	P1(*敏寶儀蘇)	P3(*嘉薇霽香)	P6(*荃高葉楚梁)
下午 3:20-4:00	P2(*慧秀倩寶)	P5(*卿龔雅卿)	P3(*淑睿玲偉) P2*(葉轉荃美)
下午 4:00-4:40	非華語共備(*蔭映秋勞)	P6(*香于艷施楊)	P1(*美楚鄺龔)

2. P1 及 P4-6NET 共備需自行另找時間。
3. 其他級別的學習圈/共備: 已編於時間表內, 見各人時間表。

(八) **全日制**星期五 2:30-4:40 中英數共備/常識/成長課共備日期安排如下:

日期	星期	內容	備註
16-9-2022	五	中英數共備	
23-9-2022	五	中英數共備	
30-9-2022	五	成長/班營共備	馮及各班任
7-10-2022	五	中英數共備	
14-10-2022	五	常識科共備	高及常識科任
21-10-2022	五	中英數共備	
28-10-2022	五	中英數共備	
4-11-2022	五	/	聯校教師發展日
11-11-2022	五	/	P1-6 總評估
18-11-2022	五	中英數共備	屯門區運動會
25-11-2022	五	成長/班營共備	馮及各班任

2-12-2022	五	中英數共備	
9-12-2022	五	常識科共備	高及常識科任
16-12-2022	五	中英數共備	
23-12-2022	五	/	聖誕假期
30-12-2022	五	/	聖誕假期
6-1-2023	五	中英數共備	中英數共備
13-1-2023	五	中英數共備	中英數共備
20-1-2023	五	/	農曆新年假期

(九) 共同備課工作指引：

	內 容	負責老師
備課會內	<p>高識教學難點：</p> <ul style="list-style-type: none"> - 教師聚焦要討論的內容，就學生學習該課題的難點作分析、討論及澄清，並針對學生學習的難點作出教學策略的調整(包括：教學目標的釐定/教學方法的調整/教學活動的設計修正/課業的修正/評量準則的設定等)。 - 教師針對上述的調整輪流作共備紀錄，如有工作需會後完成，也應作相關的分工安排及記錄在「共同備課/學習圈紀錄表」內。 <p>檢討(陳述教學情況及討論)：</p> <ul style="list-style-type: none"> - 教師針對同一課題作學與教的分享，即學生學得怎樣?教師如何教?教學當中有何發現?如重新執教，會作怎樣的調整? - 相關的反思需要記錄在「共同備課/學習圈紀錄表」，以為下學年任教的同事提供參考。 	科任
備課會後	<ul style="list-style-type: none"> - 由級聯絡統籌各科任輪流作會議紀錄。 - 「共同備課/學習圈紀錄表」需於<u>下次會議前</u>存檔於各科級「共同備課文件夾」內，以供同事參詳。 - 科長日常需檢視各級「共同備課/學習圈紀錄表」以了解各級的共同備課情況並及時給予支援，期末在課程與教學委員會議上需就共同備課情況作簡要的工作匯報。 	科任 級聯絡 科長

簡要流程如下：

小組共備 → 分工預備教學資源(如有需要) → 實施 → 檢討

(十) 學習圈工作指引：

	內 容	負責老師
準備工作	<ul style="list-style-type: none"> - 第一次學習圈備課，級聯絡需帶領各科任針對教學進度及學科的發展重點，定下本學期學習圈的初步研究課題，記錄於「學習圈研究課題計劃簡表」內。 - 根據定下的初步計劃，針對要討論的內容，教師就學生學習該課題的難點作發散性的思考。 	級聯絡 科任
備課會內	<p>商議教學難點：</p> <ul style="list-style-type: none"> - 教師聚焦要討論的內容，就學生學習該課題的難點作分析、討論及澄清，並針對學生學習的難點作出教學策略的調整(包括:教學目標的釐定/教學方法的調整/教學活動的設計修正/課業的修正/評量準則的設定等)。 - 教師針對上述的調整輪流作紀錄，如有工作需會後完成，也應作相關的分工安排及記錄在「共同備課/學習圈紀錄表」內。 <p>檢討(陳述教學情況及討論)：</p> <ul style="list-style-type: none"> - 教師針對同一課題作學與教的分享，即學生學得怎樣?教師如何教?教學當中有何發現?如重新執教，會作怎樣的調整? - 相關的反思需要記錄在「共同備課/學習圈紀錄表」內，以為下學年任教的同事提供參考。 	科任
備課會後	<ul style="list-style-type: none"> - 教師分工把學習圈研究課計劃及有關的教學資源存檔於各科學習圈文件內。 - 由級聯絡統籌各科任輪流作會議紀錄。 - 「共同備課/學習圈紀錄表」需於<u>下次會議前</u>存檔於各科級學習圈文件夾內，以供同事參詳。 - 科長日常需檢視各級「共同備課/學習圈紀錄」表以了解各級的學習圈情況並及時給予支援，期末在課程與教學委員會議上需就學習圈情況作簡要的工作匯報。 - 同級同事執教同一課題，期間進行互相觀課(觀課形式科本安排)。期末在課程與教學委員會議上需就學習圈情況作簡要的工作匯報。 	科任 級聯絡 科長

簡要流程如下：

小組共備 → 分工預備教學資源 → 檢視教學資源 → 實施 → 檢討

(十一) 共同備課/學習圈的行政要求：

共同備課：

1. 填寫「共同備課/學習圈紀錄表」(由教師輪流作紀錄)，內容包括商議教學難點或教學檢討。(詳見共同備課工作指引)每學期不少於 8 次或以上的共備紀錄。

學習圈：

1. 填寫「學習圈研究課計劃簡表」。
2. 填寫「共同備課/學習圈紀錄表」(由教師輪流作紀錄)，內容包括商議教學難點或教學檢討，每學期不少於 8 次學習圈共備紀錄。
3. 就每一教學課題共備的相關教學資源需分工完成，包括以下資料：
 - A) 集體商議訂定的教案
 - B) 教學資源的預備(簡報/教具/活動工作紙/評估/延伸活動等)
4. 同級教師就同一課題，根據教案執教，教師間進行觀課。(執教者開放課堂，其他教師可因應空堂或作調動進行觀課並填寫觀課表，執教者也需就自己的教學填寫觀課表以作自我反思。如該班未能有教師前往觀課，需以拍片形式作紀錄。)
5. 各教師就觀課及執教的教學情況作出檢視，重新思考：如再執教此課題，會針對哪一方面？作何調整？(此反思需要記錄於教案反思欄內，以供下一學年的教師作參考之用。)
6. 參與學習圈的組別每學年需於本科作一次或以上的教學案例分享，以擴闊同事的教學視野，建構彼此的教學思維。
7. 科組學習圈運作成熟後，可構思跨學科交流的同課異構教學研究。

十三 級連絡的工作要點：

共同備課：

1. 級聯絡統籌小組帶領小組針對教學要點展開討論及作教學檢討；
2. 級聯絡統籌各科任輪流作會議紀錄及預備相關教學資源(如需)。
3. 級聯絡需落實科長安排的工作，向科長匯報小組共備的情況。

學習圈：

1. 級聯絡統籌小組帶領小組針對教學要點展開討論及作教學檢討；
2. 級聯絡統籌各科任輪流作會議紀錄。
3. 級聯絡統籌協調各科任作教學資源預備。
4. 級聯絡統籌協調各科任的觀課安排。
5. 級聯絡需落實科長安排的工作，向科長匯報學習圈的情況。

(***完***)

Appendix eight:**Concept clarification for the Teaching Sharing and Learning Circle of Y School (in Chinese)****學習圈**

由教師組成「學習圈」，一起找出、解決教學上所共同關注的問題，透過實踐和自我反思，改善教學方法，增強團隊協作，提升學與教效能。

比較「教學交流 (17-18)」及「學習圈 (18-19)」

比較項目	教學交流 (17-18)	學習圈 (18-19)
參加對象	同級 / 跨級	同級
交流形式	<ol style="list-style-type: none"> 1. 個人設計教案及資源； 2. 執教該課題的同工在交流會上說出構想，其他同事提出意見； 3. 該同工自行修正執教； 4. 其他同工觀課評課。 	<ol style="list-style-type: none"> 1. 小組成員針對課題找出學生學習的難點，定出教學方案； 2. 小組成員分工合作預備相關教學資源； 3. 小組成員共同檢視預備的教學資源，作出修正； 4. 小組成員執教同一課題，開放課堂； 5. 小組成員共同檢討反思； 6. 小組成員輪流作會議紀錄。
特點	個人負責為主。	集體智慧，共同建構優質課堂。

比較「共同備課 (17-18)」及「共同備課 (18-19)」

比較項目	共同備課 (17-18)	共同備課 (18-19)
對象	同級 (A/B 組)	同級 (如參加學習圈的級別不用參加共同備課組)
次數	每學期 4-5 次	每學期 10 次或以上
內容	<ol style="list-style-type: none"> 1. 大部分科目因次數限制偏向事務性質。 2. 由級聯絡作共備紀錄。 	<ol style="list-style-type: none"> 1. 落實共同備課的效能，就「教甚麼?如何教?教得怎樣?」作共備； 2. 小組成員輪流作共備紀錄。

2018-19 共同備課及學習圈的安排

	共同備課 (18-19)	學習圈 (18-19)
對象	同級	同級
次數	每學期 10 次或以上	每學期 10 次或以上
內容	<ol style="list-style-type: none"> 1. 落實共同備課的效能，就「教甚麼?如何教?教得怎樣?」作共備； 2. 小組成員輪流作共備紀錄。 	<ol style="list-style-type: none"> 1. 小組成員針對課題找出學生學習的難點，定出教學方案； 2. 小組成員分工合作預備相關教學資源； 3. 小組成員共同檢視預備的教學資源，作出修正； 4. 小組成員執教同一課題，開放課堂； 5. 小組成員共同檢討反思； 6. 小組成員輪流作會議紀錄。
特點	達成基本的教學共識。	達成教學共識，共同預備，共同執行，共同反思。

Appendix nine:

Y School's case report on Reading across the Curriculum, co-written with a university partner (in Chinese)

一. 前言

從 3D 打印機、課外活動、拔尖課程開始，經過一系列的教師培訓、專業支援，到現在融入核心課程、跨學科教學，香港的 STEM 教育逐漸向普及化及常規化方向發展，讓每一個學生都平等地獲得學習相關知識和技能的機會。STEM 教育除了發展學生在科學、科技、工程和數學各範疇的知識外，也需著重在跨學科的整合應用，並透過問題導向學習 (problem-based learning)，讓學生運用工具和適當技能，手腦並用地解決真實世界中的問題 (Sanders, 2009)¹。

從 2015 年開始，香港教育局陸續推出了推動 STEM 教育的措施，其中一份文件也提及了「學校要以跨學科的方式，為學生在課堂內外安排多元化的學習活動，學習 STEM 範疇的知識和技能，了解科學和科技與日常生活息息相關，明白相關的知識及其應用是不可割裂的」²，更於 2022 年加入藝術 (Arts) 的意涵，將之優化為 STEAM 教育，從而更全面地培養學生科學和藝術領域的思維和素養。這些政策都突顯了跨學科整合是 STEM 或 STEAM 教育中不可或缺的理念。

在多方面的推動下，近年不少學校都開始嘗試跨學科協作的 STEM 教學模式，例如在小學課程中要求學生製作電子工具去測量或解決日常問題，當中便包括常識科的生活情景、電腦科的編程和數學科的計算。由於數學、常識、電腦這三個科目與 STEM 的關係相對密切，「數常電」便成為小學 STEM 課程中跨學科協作的常客。另一方面，把語文、視覺藝術、體育、宗教等「非 STEM 學科」加入成為 STEAM 或 STREAM 課程亦開始受到關注，不過，這種「非 STEM」和「STEM 學科」協作的教學模式在香港才剛起步，如何將不同的學科內容加以融合，並讓更多教師能夠更了解跨學科協作的 STEM 教學模式是本文的目的。本文將會以樂善堂梁黃蕙芳紀念學校的中文跨課程閱讀和常識 STEM 活動協作為例，闡述如何整合中文、常識及數學的知識在課程活動裡面。

二. 背景

Y School 從 2018 年起在一年級推行跨課程閱讀，逐年推進到了 2021 年的四年級，閱讀內容為《西遊記》中的《三借芭蕉扇》一段，並加入「堅毅」的情意教育主題。適逢本中心正推行「促進香港小學 STEM 教育的跨學科教學法計劃」，於是雙方合作推行跨課程閱讀與 STEM 結合的活動，讓小四學生在閱讀的同時增加手腦並用和發揮創意的機會——製作芭蕉扇。以往的閱讀課程著重「閱讀技能」的培養，而跨課程閱讀可以擴闊學生不同學科的知識領域，這次的中文、常識協作將更加強學生在 STEM 方面的學習和體驗。因此，學生製作的不是一般的芭蕉扇，而是能和故事內容對應起來的作品。

三. 策略

1. 做好課程規劃

《三借芭蕉扇》的跨課程閱讀流程是這樣的：首先中文課(兩節)讓學生理解《三借芭蕉扇》的內容大意，以及學習從人物的行動描寫和具體的事例分析人物的性格；常識科(三節)承接「芭蕉扇滅火」的概念，讓學生理解風、火、溫度等自然知識和關係，並透過設計循環製作並改良自己的芭蕉扇(當中鞏固已學到的數學知識)；最後中文課(兩節)給出改寫《三借芭蕉扇》故事的題目，要求學生發揮創意，把自製的芭蕉扇融入自創的故事情節中，完成故事續寫。

¹ Sanders, M. (2009). Integrative stem education: Primer. *The Technology Teacher*, 68 (4), 20 20-26.

² 教育局 (2020)。立法會教育事務委員會 推動 STEM 教育 工作進展及相關加強的支援措施。香港：香港立法會。取自：<https://www.legco.gov.hk/yr19-20/chinese/panels/ed/papers/ed20200703cb4-764-2-c.pdf>

這是一種被稱為「滾雪球式」的跨科協作模式，即「活動的設計由單一學科開始，其後逐漸擴展至其他學科，以擴展綜合學習的空間的教學設計」³。良好的課程規劃是必須的，負責課程統籌的高層需非常清晰和有條理地安排課程的先後次序和內容，考慮各科之間的銜接和教師之間的配合，因應學生的進度而作出調適，才能設計出綜合和延續的、而非各科「完全獨立授課」的跨學科課程。



2. 以讀帶寫、說、聽和創作

閱讀課程強調學生在聽說讀寫能力的培訓，跨課程閱讀更能帶動其他範疇的學習。是次活動滲入「創作、改寫」元素，以奇幻故事《三借芭蕉扇》為切入點，學生在中文教師帶領下閱畢文章後，在家自由創作故事內的人物和道具並回校與同儕分享，既訓練說話和聆聽能力，亦有助刺激思考，訓練學生綜合運用語文能力和創作力。在提升聽說讀寫能力之同時激發學習興趣，加強學習效能。

³ 李揚津、鄧權隱、羅家駒、李海洋、李文樂、陳文豪等(編)(2019)：《教出 STEM 姿采：十四所中小學的專業發展路》，香港，香港教育大學。



3. 從天馬行空到現實製作

到了常識課，教師利用學生閱讀過的「孫悟空搗風滅火」的故事情節，先與學生重溫燃燒的基本元素和如何利用風力滅火的科學原理，並帶出製作芭蕉扇的活動主題。常識教師需要引領學生從天馬行空的創作回歸到現實的製作，首先透過播放不同種類的扇的圖片，與學生討論它們的結構、形狀和物料的特點，並帶出這些特點與搗風強弱的關係。然後學生運用已學會的知識設計芭蕉扇，形狀和物料都沒有限制，只有扇子大小規定為「周界不超出 100 厘米」的條件。這樣的限制原因有兩個：第一，把扇子大小統一能助學生集中比較剩下的兩個影響因素；第二，因為學生可隨意設計扇子的形狀，用繩子量度周界比起計算不規則面積方便不少。在學生完成初步設計和分享後，教師以提問及追問的方式提示學生改良的地方，隨後便回家製作並在下一課節進行測試。

孫悟空借不到芭蕉扇，正在思量不如自己
做一把，但不知道從何入手，你可以
幫忙，為孫悟空做一把芭蕉扇嗎？

扇子結構？

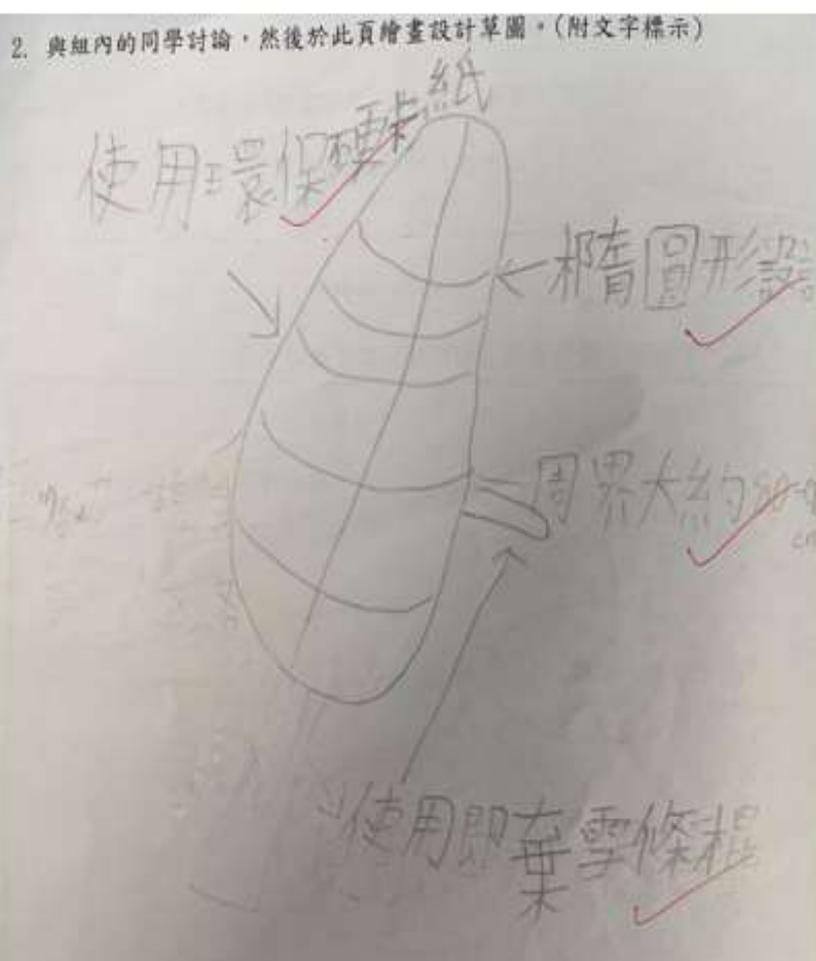
要多大？

甚麼形狀？

用甚麼材料？

扇子的不同形狀





4. 公平測試與設計循環

學生製成芭蕉扇後便需進行測試，運用葉片式風速計量度搨風風速。教師在這裡引入公平測試的概念，利用反問、錯誤示範等方式誘導學生一同訂立公平的測試標準，包括芭蕉扇和風速計的距離、搨風的角度和時間等。學生會以小組形式進行測試，透過小組成員輪流擔任操作風速計、搨風、監察和記錄的工作，彼此互動與合作提升學習成效。小組內比較結果後得出當中風速最大的設計，討論和加以改良後作為小組代表，參與下一課節的搨風測試。

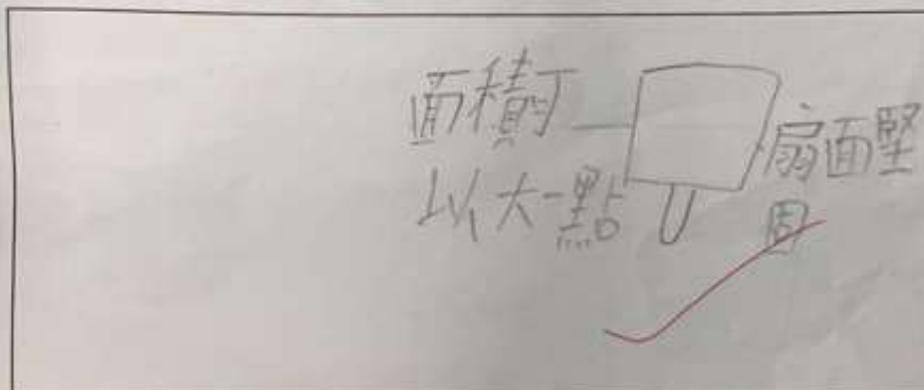


為了讓學生更投入和學習更多，我們製作了一個簡單的火焰山模型，讓學生模擬孫悟空拿扇撥向火焰山的故事情景。模型上用了不同長度的紙條懸著膠粒，學生在指定距離搨風，觀察膠粒的擺動情況，並從中發現一些力學原理。測試完畢，學生便在工作紙上寫下自己的反思、互評、總結整個設計循環中的得著等等。



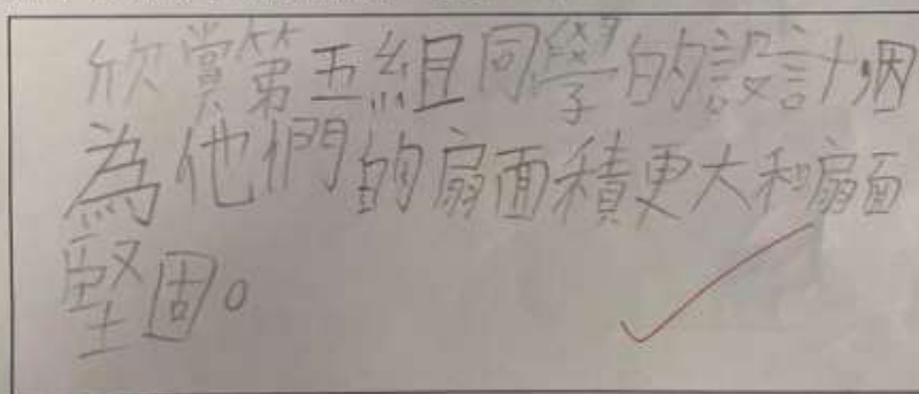
4. 對於自己組別的製作，有以下反思：

(用文字或繪圖分享製作的優點、改善之處等內容於下方)



5. 同儕互評：

(例子：欣賞第？組同學的設計，因為……)



5. 創設情景，引導學生構思新結局

回歸中文課，同時是跨課程閱讀的最後一個環節，希望透過閱讀改編版《三借芭蕉扇》及續寫，讓學生發揮創意，運用所學的字詞、語文知識和製作經驗創作故事，例如：運用常識科所學的製作芭蕉扇的相關知識，創作師徒數人合力製作新的芭蕉扇的情節內容。此外在寫作前，學生會先進行一次口頭分享，同儕互評後教師再給予回饋，使學生能聽到不同的想法從而開拓自己的思路。由於學生有自己製作扇子及小組討論的經歷，大大減少了小學作文時，學生苦無頭緒不知從何入手的情況。

四. 結語和反思

是次跨學科課程以中文閱讀和常識 STEM 教學作為試點，安排「閱讀、製作、寫作」的學習活動；中文科指導學生閱讀和續寫故事，讓他們掌握聽說讀寫的語文能力和創作能力；常識科指透過讓學生動手做和做中學，掌握思維的方法和解難的策略，同步提供機會讓他們實踐在數學科的已有知識和中文科的創作。我們期望這樣的嘗試有助學生連接三科所學，增加他們貫通和深化各科知識的機會，提升學生的綜合能力，使課堂教學的效果達到乘數效應。

當然，沒有一個課程或課堂是完美的，是次活動也存在著一些問題，包括：教學時間會促，壓縮了部分學生分享和測試的時間；學生在常識課中運用的中文知識偏少；教師未能有效運用課室空間，學生需要迫在講台附近排隊進行測試；扇子只有「風速」一項比較標準，忽略了以視覺和美術為目標的學生作品；火焰山模型的膠粒擺動不夠明顯，需要繼續改良…等等。我們都需要認真回顧、梳理，並作出深刻反思和改進，使課堂教學不斷優化成熟。

跨課程學習的課程無疑是複雜的，當中需要整合不同學科知識，而且令學科之間的學習環環緊扣。教師除了要考慮自己科目的教學目標，同時要考慮對其他科目的影響及學生最終的學習成果，這並不是把一個已設計好的跨學科課程交由教師執行便能成事的。教學團隊的主動性和教師之間的協作是實現跨課程的關鍵，課程統籌主任可作為召集人和領導，帶領不同科目教師共同設計、規劃教學活動，才能有效地把各科知識連繫，為學生帶來綜合和豐富的學習體驗。

Appendix ten:

Primary Six Unit lesson Plans of Reading across the Curriculum (in Chinese)

Y School

2022-2023 年度 跨課程閱讀 教案

六年級 中文科 科任：A、B、C、D、E

執教日期：4月24至26日

單元名稱：跨課程閱讀

主題／課題：《地球最後一秒鐘》

課節：三至四個課節

學生已有知識：

1. 學生已於圖書課學習了「三知閱讀法(K-W-L)」閱讀圖書的技能。

學生學習目標：

1. 運用「三知閱讀法(K-W-L)」及自擬問題閱讀《霧：浪漫的殺手》。
2. 推行整書閱讀，透過共讀參與提升學生閱讀的興趣，從中培養閱讀能力，並提升主動學習能力。

學生學習難點：

1. 《地球最後一秒鐘》為自然科學類書類，文字以說明性質為主，非所有學生都會感興趣閱讀的圖書，因此，該如何提升學生的參與，激發學生自主閱讀的興趣？

課前準備：

1. 閱讀《霧：浪漫的殺手》，利用 Padlet 完成「已知」和「想知」部分。

設計理念：

教學設計以學生為中心，運用「三知閱讀法(KWL)」及自擬問題貫穿課堂，讓學生成為學習的主導者，以促進學生自主學習。課堂中，老師利用學生的問題引領課堂教學，學生通過解答同學問題理解文章內容，並再次引發學生自擬問題理解課文內容，學生在課堂上持續評估自己對文本的理解，加深對文章的理解，讓學生更投入課堂，提高閱讀興趣，並培養閱讀能力和信心，提升主動學習能力。

教節	流程	學習活動	對應的學習目標	對應的評估策略	教學資源	時間
1	(一) 引入	<ul style="list-style-type: none"> 簡單重溫「三知閱讀法(KWL)」。 展示課題《霧：浪漫的殺手》，引起學習動機。 		觀察學生的分享 提問	nearpod	5'
	(二) 發展	<ol style="list-style-type: none"> 1. 「已知」 <ul style="list-style-type: none"> 展示學生的預習成果，讓學生分享對課題的理解，喚起學生與教學內容有關的背景知識，並作出猜測。 2. 「想知」 <ul style="list-style-type: none"> 展示學生提出的問題，學生分組選出認為問得較好和不太好的問題，並解釋原因，以及合作修訂提問欠佳的題目，老師適時給予回饋。 <ul style="list-style-type: none"> 預設問題： 	學習目標 1	觀察學生的分享 提問	黑板 nearpod 圖書： 《地球最後一秒鐘》文本節選	5' 15'

	<ul style="list-style-type: none"> ◇ 為甚麼霧是浪漫的殺手？ ◇ 霧會殺死誰？ ◇ 甚麼時候會最大霧？ ◇ 香港哪個地方最大霧？ <p>3. 「得知」</p> <ul style="list-style-type: none"> ➢ 利用所選問題，讓學生帶著目標閱讀，在書中找出答案與證據，然後進行分享。 ➢ 部分問題未必能在文中找到答案，老師可著學生回家進行資料搜集，補充文中沒有提及的內容，在下一節報告。 				10'
(三) 總結	<ul style="list-style-type: none"> ➢ 著學生回顧學習過程，並嘗試歸納「三知閱讀法(K-W-L)」及「自擬問題」策略的好處。 ➢ 請學生用一句話總結課堂所學。 	學習目標 1	觀察學生的分享 提問	黑板 nearpod	5'
(四) 延伸	<ul style="list-style-type: none"> ➢ 1. 完成 KWL 工作紙整理 ➢ 2. 延伸工作紙（運用「三知閱讀法(KWL)」閱讀《奪命的季候風》） 	學習目標 2			

教學反思：

6A：

是次學習圈主題為利用「三知閱讀法」(下稱：KWL)閱讀策略及自擬問題進行跨課程閱讀，課堂加入電子元素，學生利用 Nearpod 學習，以提升學生的參與度。期望學生能能在這節課中掌握有效的閱讀策略，從而推動學生進行整書閱讀，提升自主學習的效能。

首先，學生透過預習工作紙進行預習，針對篇章題目構思「已知」部分，以喚起學生的已有知識。在這部分學生均能緊扣主題內容寫出個人的已有知識，例如：霧的定義和形成，以及霧給人的感覺等。

此外，學生在「想知」部分需要針對篇章題目設想自己想知的問題。大部分學生設想的問題比較單一，部分學生更未能緊扣主題的關鍵詞和利用六何法作出提問。針對這個學習難點，課堂中老師會先展示學生的預習成果，然後引導學生指出問題的不足，並廣架學生提問的技巧，包括：抓住題目的關鍵詞和靈活運用六何的提問詞等，然後進行二人分組，設想一道更具體、更聚焦的問題。學生在老師的引導下，能圍繞主題設計針對性的問題。

最後，老師篩選出學生有效的提問，並利用這些提問著學生在篇章中找出答案，讓學生帶著問題，有目的地閱讀篇章。學生能在篇章中找出問題的答案，可是由於時間關係，未能完成分享答案的環節，最後只有一位學生作分享。此外，總結部份亦比較倉猝，時間掌控方面可處理得更好。建議「已知」部分的內容可減少，重點展示部分預習成果作講解，讓總結部份有更多時間完成，以進一步強調「KWL」中的已知、想知和得知三者之間的相互關係和聯繫。

整體而言，學生在課堂中表現良好，課堂加入電子學習元素，利用 Nearpod 輔助學習，大部分學生於課後表示喜歡電子學習，可見，這次的教學設計能提高學生的學習動機，並提升學生的課堂參與度。

總括而言，「KWL」閱讀策略以學生為中心，讓學生成為學習的主導者，能進一步激發學生思考，提高學生的閱讀興趣和自主學習的能力。

6B：這次使用 NEARPOD 貫穿整個課堂之中，對於學生來說，可謂大大增強師生、生生間的互動。亦是未來教學的大趨勢。

尤其對於 SEN(讀寫/專注力不足的學生)也大大提高了他們的信心，他們可以用語音代替文字書寫，而且於平板加入不同的相關活動，能大大增加學生的興趣與專注。

另一方面，KWL 閱讀法能讓學生遷移到其他的閱讀當中，有學生分享他用於影片的理解之中，另有學生運用於其他的讀文之中。這樣，他們可以將這閱讀法融入在生活之中，實是一大得着。

最後，對於這次的課堂設計，將主導回歸給學生，由他們自擬問題、提出問題、解答問題，當中發現的過程，就是有趣的地方，老師只是一點撥的角色，大大提升了他們的自學能力和解決問題的能力，亦是將來升讀中學必須要具備的才能。

6C：這次的學習圖網線，同樣能互相貢獻教學點子，加入電子元素 Nearpod 在課堂上的運用，在學與教方面是一大跨越。本人也在這次的學習圖網線中增加了運用電子教學推進學與教的信心。

6C 同學在 KWL 的運用方面在英文科的學習上已熟習，學生對 KWL 的模式學習的技巧已然掌握，但在學習的深度上仍需加強。根據孩子的課前預習，教者觀察到本班學生在根據主題自擬問題方面表現欠佳，部分同學在自擬問題方面未能緊扣關鍵詞進行提問的思考，所以在本班教學的設計上，教者在自擬問題方面進行了層架的搭建，以題目中的關鍵字，引導學生進行問題的比較，以建立學生對圍繞關鍵詞提問的技巧。

總的來說，「KWL」閱讀策略有助學生進行自學，值得在日常教學中持續運用，以促進孩子的學習。

6D：學生大致瞭解「KWL」閱讀策略，從「想知」擬定問題，開始運用時大部分學生未能從標題找出關鍵字設定問題，所設問題天馬行空，不利閱讀篇章。在引導下，學生基本能設定兩三個問題，有一定程度的學生所設定的問題，較有深度，閱讀更能起引導作用，並且有利加深理解。

總括而言，學習運用「KWL」閱讀策略，使學生閱讀篇章時，有目的、有目標，更容易掌握理解篇章。

6E：

學生本身有於英文科使用「KWL」閱讀策略，因此對此策略不陌生，但於應用在中文閱讀上，可見其「已知」概念模糊，要教師加以指導。

為了讓學生能提出有效問題，教師先作出「如何擬定合適題目」的處理，讓學生先參考一些「想知」的擬定問題，再從篇章題目中找出關鍵字，針對關鍵字擬題。大部份學生都能擬出合適的題目。但 6E 學生的擬題方向流於單一，只能問出「為什麼浪漫？」「霧如何殺人？」等問題。教師適時引用其他班別學生所問的「霧怎樣分類」，讓學生了解可以從更多角度設立問題。

大部份學生都能在篇章中找出「想知」的答案從而變成「得知」，而教師應該讓學生把找到的「得知」寫下，加深記憶。↵

↵

總括而言，「KWL」閱讀策略能讓學生「有目的閱讀」，學生不會空泛地閱讀篇章，而是帶着解決問題的目的，使閱讀變得更有意義。↵

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